DIESEL PROGRESS

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR

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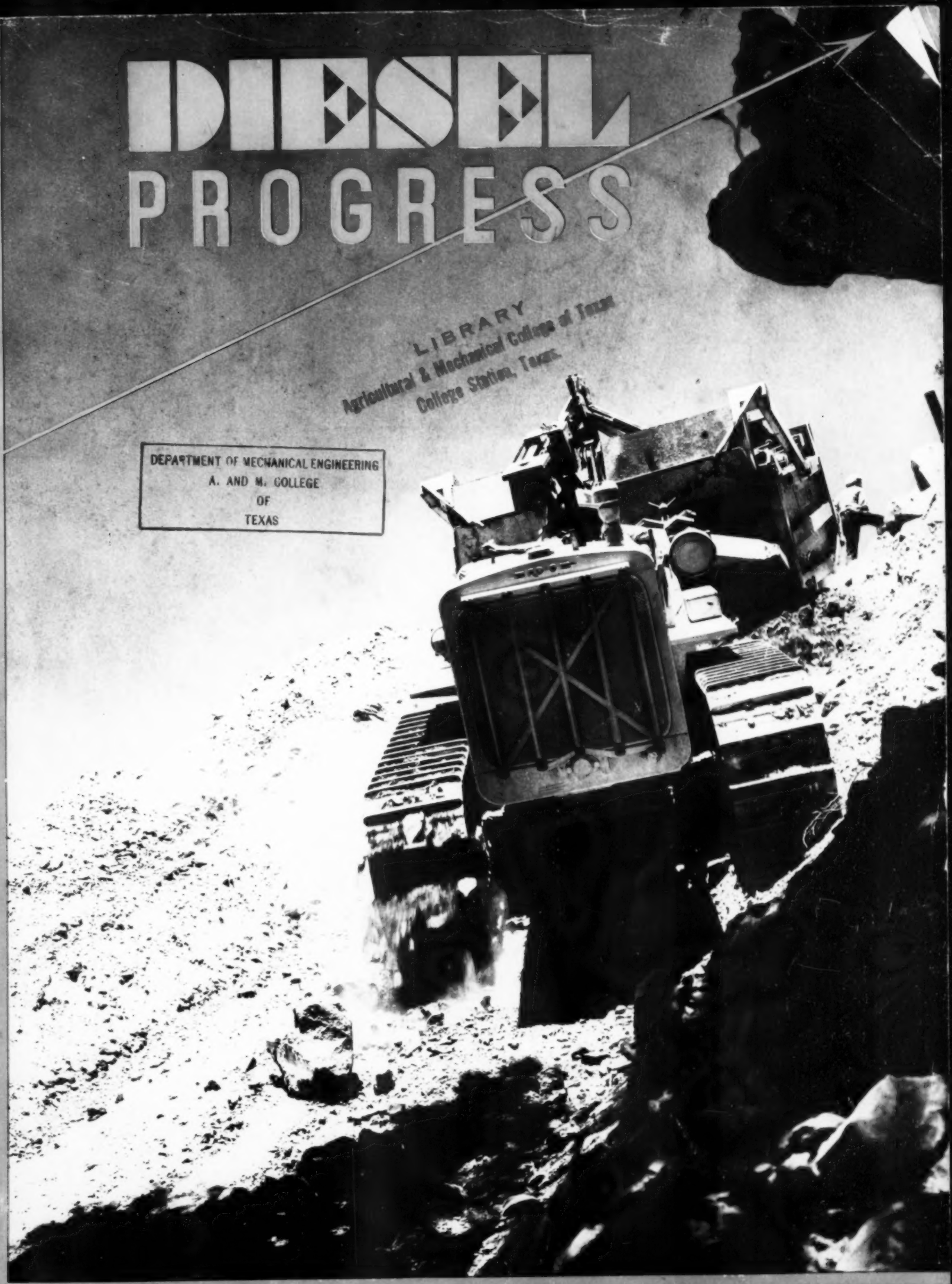

NOVEMBER, 1938 CIRCULATION OF THIS ISSUE — IN EXCESS OF 14,000 COPIES 25c

WHY LEADING DIESEL OPERATORS

Take Time to See This Man!

Socony-Vacuum

Correct Lubrication

brought to you by the Socony-Vacuum Representative, has proved its ability to cut costs...increase Diesel efficiency! It's the only lubrication service

BACKED BY 38 YEARS OF DIESEL EXPERIENCE

TIME IS MONEY! When you invest yours, you expect a return...a profit! Right? That's what the Socony-Vacuum Representative offers for the time you spend with him! The portfolio he carries contains proof of savings made in thousands of Diesel plants.

He brings you lubricants backed by the *greatest Diesel refining and lubricating experience* in the business... *Gargoyle D.T.E. Oils!*

Better refining makes these oils clean, tough, heat-resisting! They have the *film strength* to prevent costly wear...the *stability* that assures minimum consumption...and the *resistance to deposit formation* that reduces engine cleanings!

Get these oils... *and the complete engineering service that comes with them!* A Socony-Vacuum Engineer is always ready to work with your men on special problems...to help make sure you get money-saving "Correct Lubrication"! See the Socony-Vacuum Representative when he calls!

GARGOYLE

Lubricants

SOCONY-VACUUM OIL CO., Inc.

STANDARD OIL OF NEW YORK DIVISION · WHITE STAR DIVISION · LUBRITE DIVISION · MAGNOLIA PETROLEUM COMPANY
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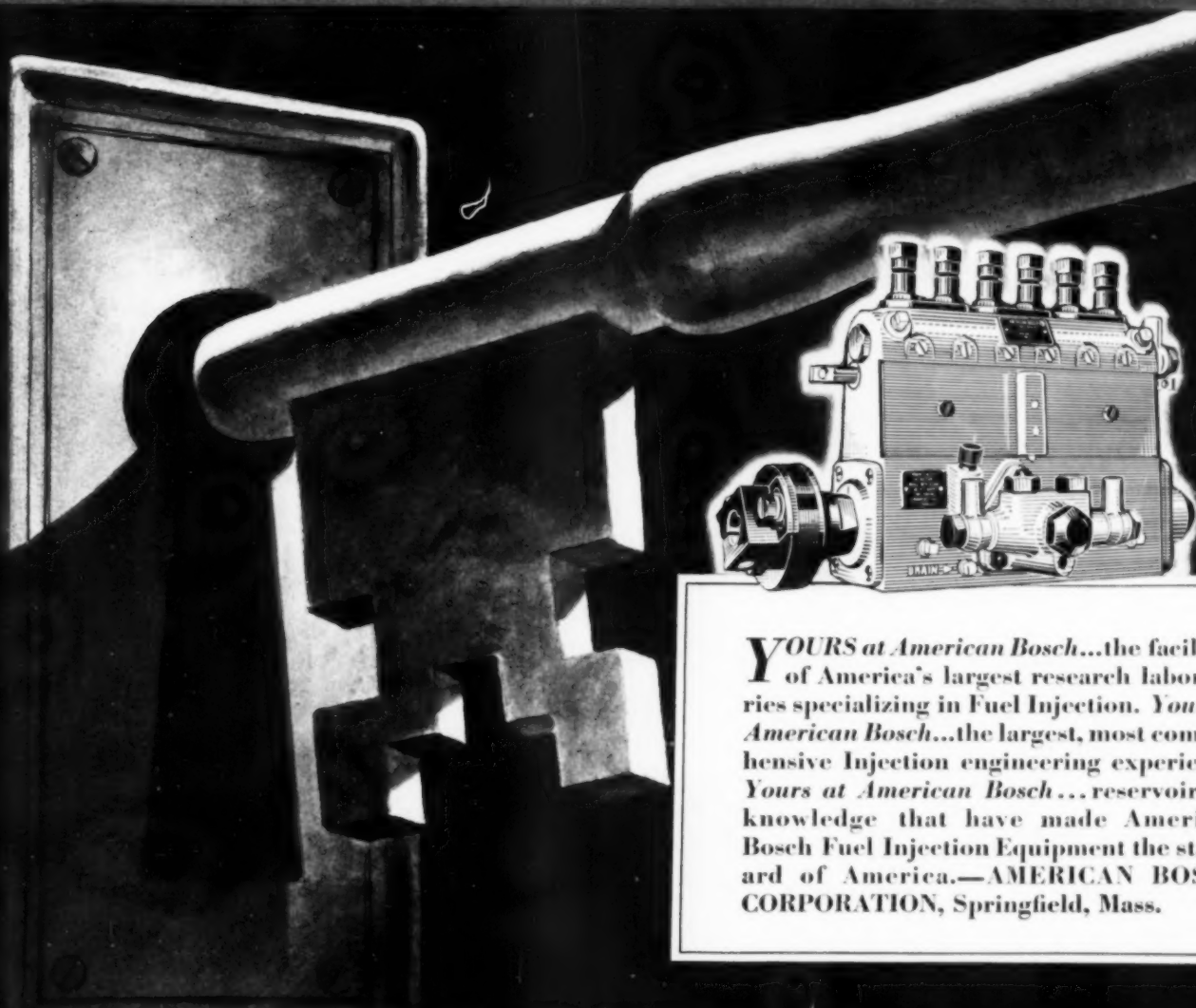
Yours!—This Key

to the greatest fuel injection knowledge in America



YOURS at American Bosch...the facilities of America's largest research laboratories specializing in Fuel Injection. *Yours at American Bosch*...the largest, most comprehensive Injection engineering experience. *Yours at American Bosch*... reservoirs of knowledge that have made American Bosch Fuel Injection Equipment the standard of America.—AMERICAN BOSCH CORPORATION, Springfield, Mass.

AMERICAN BOSCH

Fuel Injection STANDARD OF AMERICA WORLD WIDE SERVICE *Equipment*

Power

The FIRE FIGHTER,
conceded to be the most powerful fire-boat in the world, has an approximate speed of 16½ m.p.h.

GENERAL M

• DIESEL ENGINE D

hits a New High!

IN action, the City of New York's new fireboat gives spectacular evidence of its unprecedented fire-fighting ability. Under weigh, it sets a new standard of power for vessels of this type.

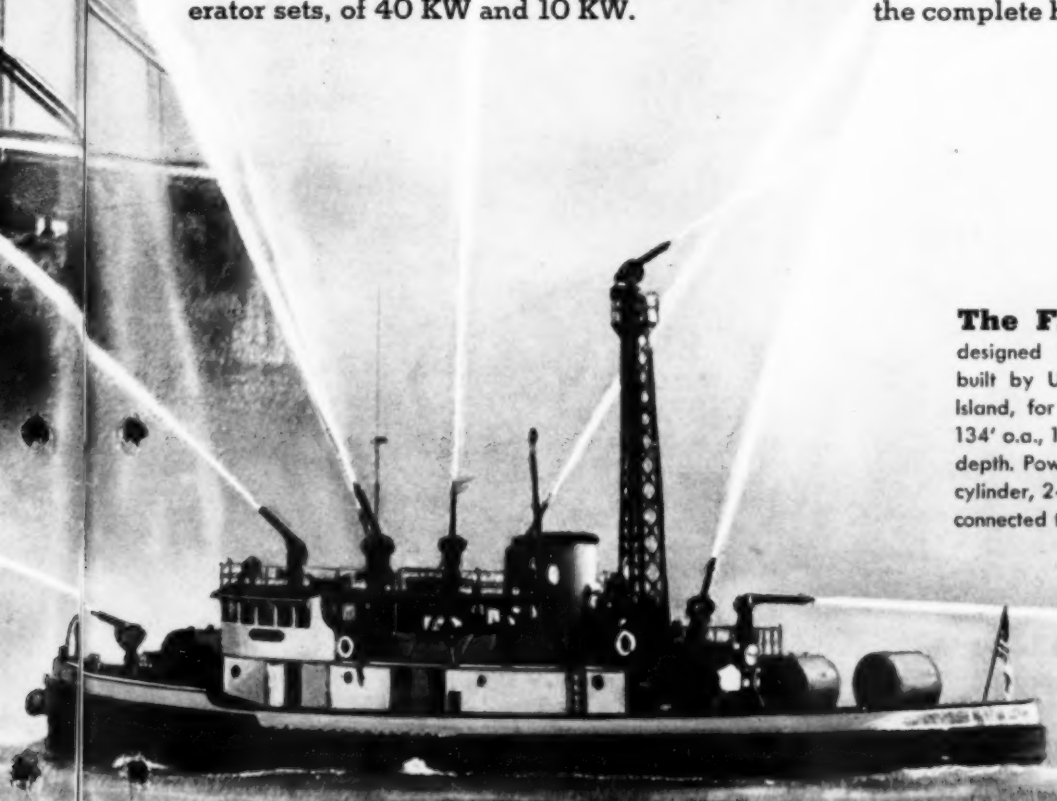
For its new Diesel Electric Drive is powered with a pair of sixteen-cylinder, two-cycle GM Diesels, of 1500 h.p. at 750 r.p.m. direct-connected to three generators—the most powerful fireboat power plant in all the world!

And for auxiliary power, which is only needed when the main engines are not running, the FIRE FIGHTER is equipped with two GM generator sets, of 40 KW and 10 KW.

Here is another conspicuous example of General Motors' ever-advancing development of the Diesel as an outstanding source of marine power—of its effective reduction of the Diesel's weight-to-power ratio—and the vast opportunities this affords operators of almost every size and type of craft to get more power and better performance at lower operating expense.

Check into the advances GM has made and learn what GM Diesel power can mean to you. It makes little difference what sort of boats you're interested in, GM Diesel Power applications now cover the complete heavy marine range.

For All Marine Uses
GM DIESELS
★ Single units—15 to 1200 horsepower ★ Multiple units—any required capacity



The FIRE FIGHTER, designed by Gibbs & Cox and built by United Shipyards, Staten Island, for the City of New York. 134′ o.a., 131′ w.l., 32′ beam, 13′3″ depth. Powered by two V-type, 16-cylinder, 2-cycle GM Diesels direct-connected to three generators.

GM DIESEL POWER
FORMERLY WINTON

MOTORS *Sales Corporation*

DIVISION • Cleveland, Ohio

2½ pounds or 647 pounds...

it's a Lynite piston

In High Speed Engines

Though the pistons in a high speed Diesel engine are small, they're traveling fast. It's a problem, therefore, to keep loads within limits that the bearings can safely carry. The lighter weight of Lynite pistons enables engineers to design for higher engine speeds without compromising bearing reliability. Aluminum's ability to distribute heat rapidly assures long life for these pistons.

In Slow Speed Engines

Pistons reach large dimensions in the slower speed Diesel engines. Here again the lighter weight of Aluminum is an advantage. The major problem, however, is the high temperature encountered in combustion chambers. In Lynite pistons, because of their superior heat conductivity, temperature gradients are small and thermal stresses are a minimum. The result is greater reliability.

In All Diesel Engines

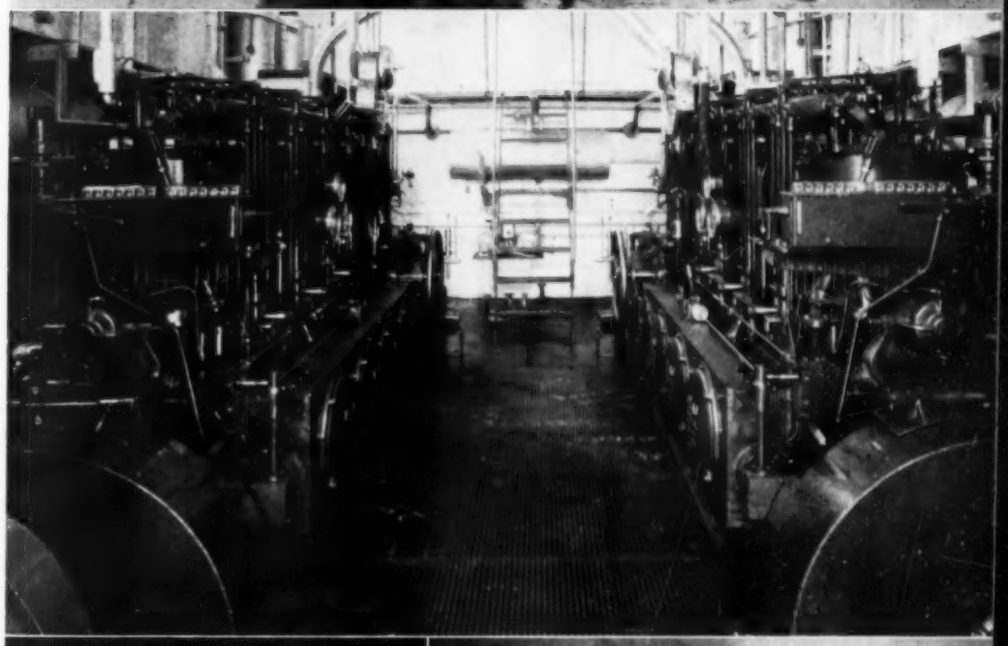
Lynite pistons are contributing to economy of operation in Diesels of all types and sizes. Specify Lynite pistons and be assured of the uniform dependability of scientifically controlled manufacture. ALUMINUM COMPANY OF AMERICA, 2141 Gulf Bldg., Pittsburgh, Pa.

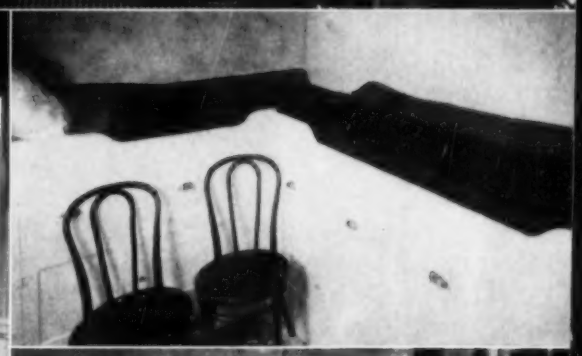
LYNITE PISTONS

CAST OF ALCOA ALUMINUM

DIESEL PROGRESS for November, 1938. Volume IV, No. 11. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 2 West Forty-fifth Street, New York, N. Y. Rex W. Wadman, President. Acceptance under the Act of June 5, 1934, at Brooklyn, New York, authorized May 14, 1935. Subscription rates: United States and Possessions $3.00. Canada and all other countries $5.00 per year. Single copy price 25 cents in U. S. A., 50 cents for all other countries.

New Western Tug "Patricia," Powered by Three Atlas Diesels





THE new Western Transportation Company tug, "PATRICIA", built at Portland, Oregon, for service on the Willamette and Columbia rivers, is one of the most completely outfitted and equipped boats ever built in the Northwest.

Three Atlas Diesel engines are in service in the "PATRICIA". Two, 6-cylinder, 200 h.p. direct reversible Atlas Imperial Diesel Marine engines are the main propelling engines for the boat. A 4-cylinder, 40 h.p. Atlas Diesel Stationary engine is direct connected to a 25 KW-DC generator, furnishing power for the towing winch, lights and five pumps of various sizes.

This splendid example of a complete Atlas Diesel engine installation, in one of the most exacting of all marine activities, is a fitting tribute to the dependable, continuous and economical performance Atlas Diesels have delivered to tug boat operators everywhere.

Atlas Diesel engines, with ten to fifteen years of tug boat service behind them, are still as efficient as when installed. Showing no appreciable signs of wear, they have many years of profitable operation before them.

Atlas sales engineers will gladly present factual findings on Atlas Diesel operating costs to help solve the power problems of your boat.

ATLAS IMPERIAL DIESEL ENGINE COMPANY

Eastern Division
115 BROAD STREET, NEW YORK, N. Y.

Central Division
228 NO. LASALLE ST., CHICAGO, ILLINOIS

Western Division
1000 NINETEENTH AVENUE, OAKLAND, CALIFORNIA

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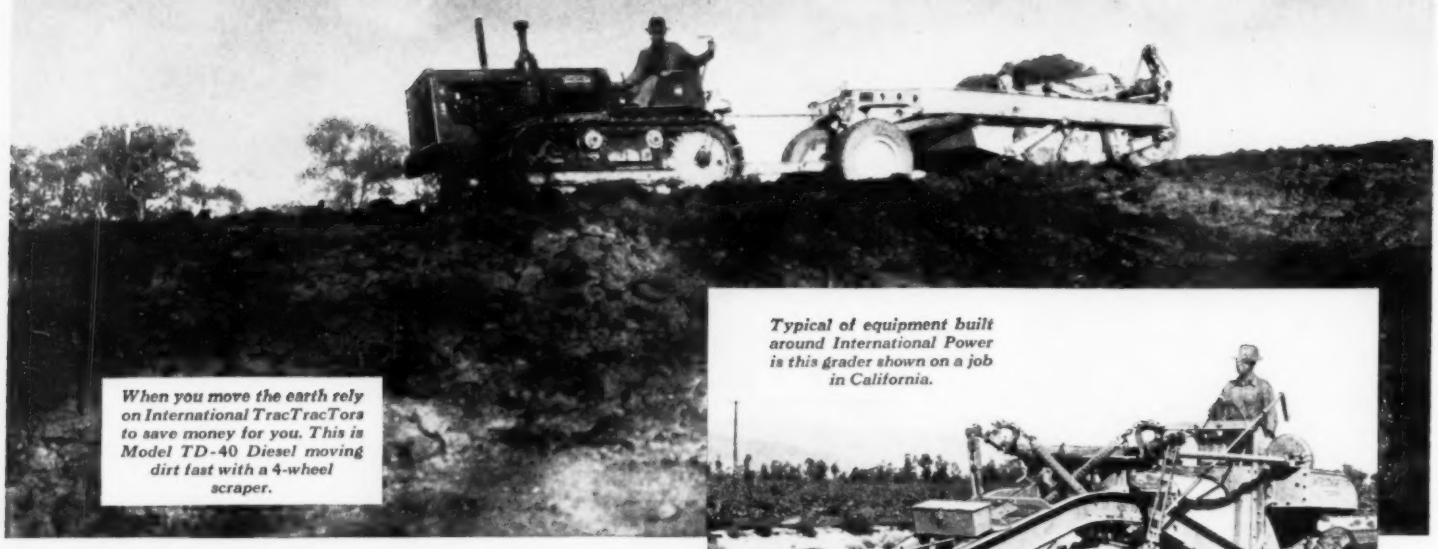
ATLAS IMPERIAL

ACTION ON THE JOB . . .

PROFIT ON THE COST SHEET . . .

with INTERNATIONAL Power



When you move the earth rely on International TracTracTors to save money for you. This is Model TD-40 Diesel moving dirt fast with a 4-wheel scraper.

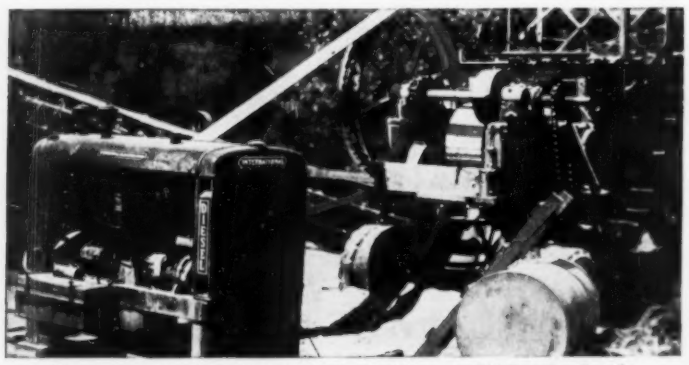
Typical of equipment built around International Power is this grader shown on a job in California.

• Great working capacity, low-cost operation and maintenance, long life—these make investment in International Power unusually profitable. The tougher the job the greater the need for International TracTracTors, Wheel Tractors, or Power Units. These International Harvester *quality* products are engineered in every detail to give *plus* performance and to cut costs to the bone.

Solve your power problems with International Power. If you need sure-footed crawler power, specify TracTracTors—available in five models for gasoline and Diesel operation. International Wheel Tractors are built in several sizes, gasoline and Diesel, with steel wheels or pneumatic tires. There are eleven International Power Units ranging up to 110 max. h.p. for gasoline, Diesel, and gas. Scores of manufacturers build high-grade equipment around these tractors and engines, making it possible to apply their power on an amazing variety of jobs.

The nearby International industrial dealer or Company-owned branch will give you complete information on how International Industrial Power can make money for you.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Avenue **Chicago, Illinois**



This International PD-80 Diesel Power Unit saves $5.30 a day for the owner of this rock crusher compared to the power it replaced. It has also increased production 75 to 100 cubic yards a day.

The International ID-40 Diesel Tractor provides the economy of the International Diesel engine where a wheel-type tractor is wanted.

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Logging camps or cotton gins — industrial or farming operations—wherever continued motor operation is essential, DUST-PROTECTION is essential. Donaldson Oil-Washed-Air Cleaners are built for just one purpose—to prevent dust-clogging with the resultant engine wear and costly delays. Donaldson Cleaners operate equally well in servicing any type of Diesel or Gasoline Engine. Both here and abroad they are being installed as standard equipment on leading makes of tractors, automotive and industrial power units.

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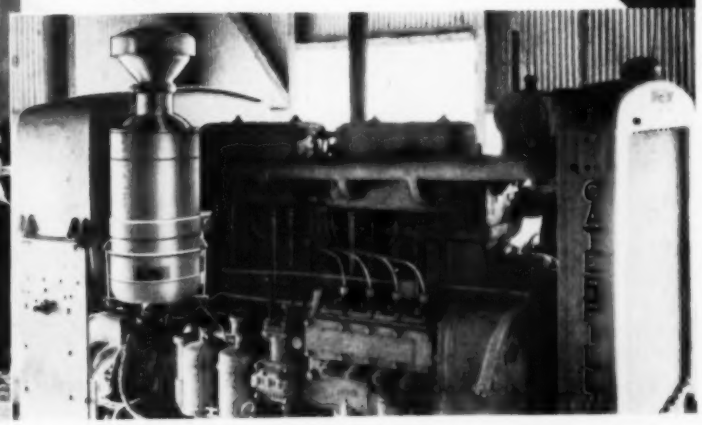
DONALDSON
Oil-Washed-Air
CLEANER

for any type of DIESEL or GAS ENGINE



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BY GOULDS

and . . .

A NEW GOULDS EXHAUST GAS HEATER FOR HYDROILS

FOR reliable protection against the dangers of clogged injection systems, install a Goulds Hydroil Centrifugal Oil Purifier on the fuel line—it will deliver nothing but clean, free-flowing oil to your diesels.

Hydroilizing fuel oil removes by centrifugal force, many thousand times greater than gravity, impurities such as dirt, water, and abrasive carbon that might plug spray nozzles. Danger of damage through wear on fuel pump plungers and valve sets is minimized. Repairs are reduced. Continuous operation is assured.

Lubricating oil, too, can be materially improved by centrifugal purification.

Cold oils and oils of high viscosity are quickly and economically brought to the proper temperature for centrifuging by a newly developed and perfected Goulds Exhaust Gas Heater that utilizes the otherwise wasted B.T.U.

Ninety years of manufacturing experience stands behind this well engineered unit, assuring dependable, economical operation that quickly repays initial cost.

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8409

RALPH T. FRIEDMANN
MILWAUKEE

October 11, 1938

Mr. Carl Hussman
120 South La Salle Street
Chicago, Illinois

Dear Mr. Hussman:

I have just laid up my welded steel ketch "TAMARIS", built by Burger of Manitowoc, and want to tell you that I am delighted with Hussman base. As you know, the same supports a two cylinder 10 K.W. Superior Diesel generator.

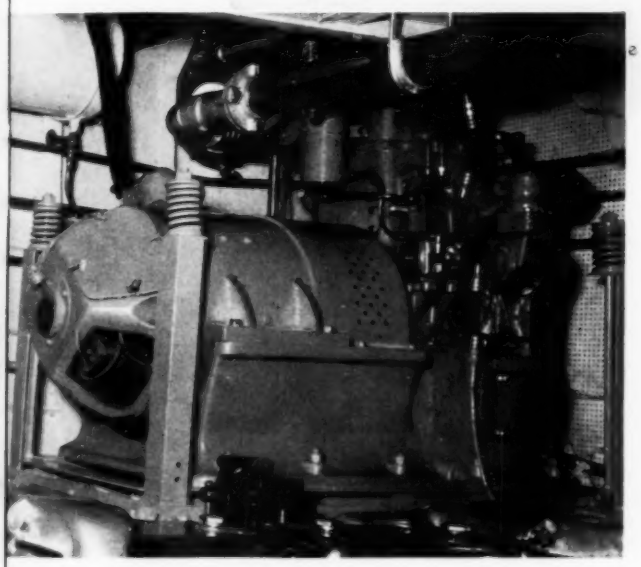
This base eliminates all vibration throughout the ship. It further operates perfectly when under sail and when heeled hard over to port or starboard.

I had frankly doubted that the astonishing results promised would be obtained to the fullest extent as they are. The development of this suspension by you has eliminated vibration and concurrent noise factors which heretofore have been an annoyance in yachts. Of course, this is particularly so when it is necessary to operate the generator under sail.

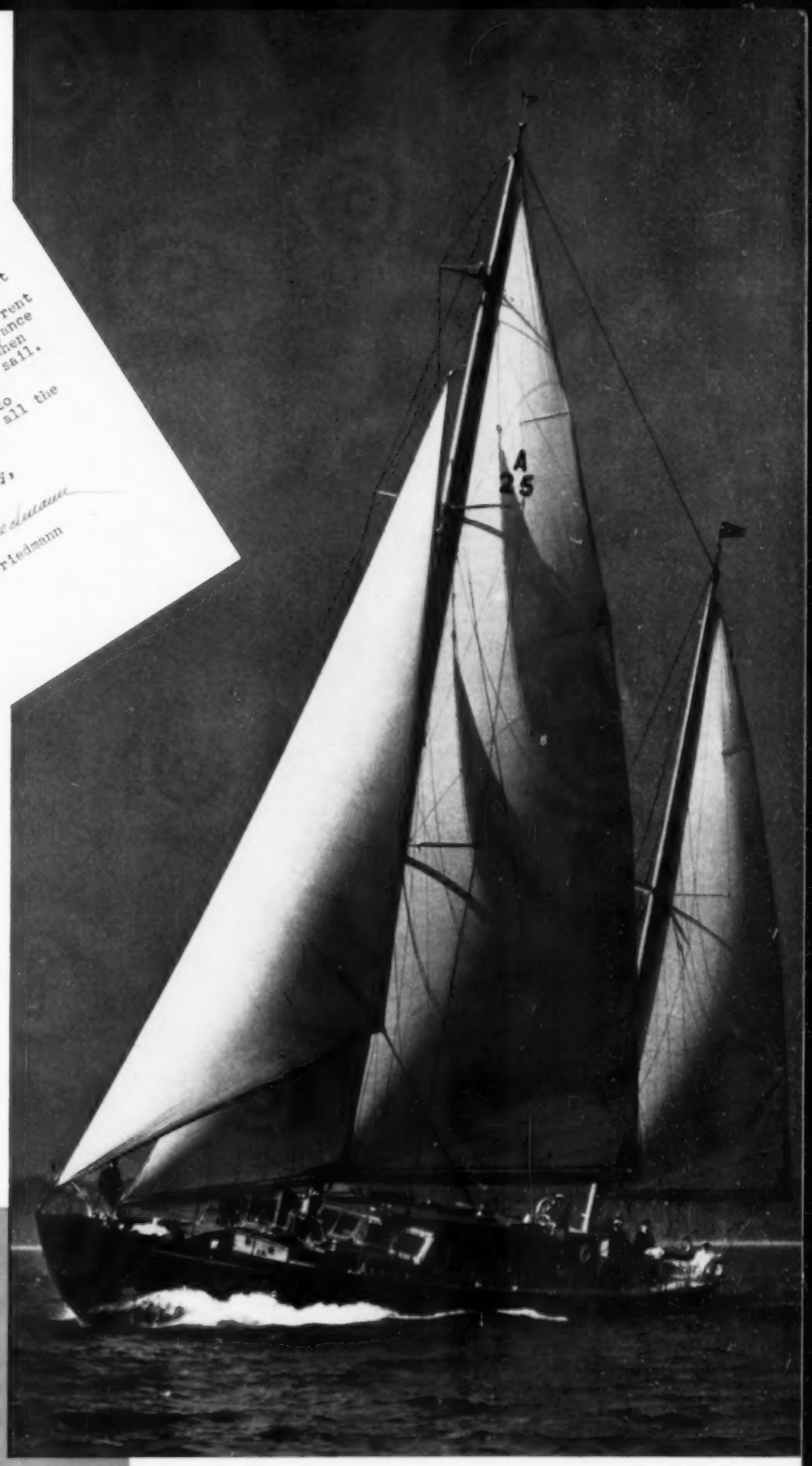
It would give me great pleasure to recommend the Hussman base and substantiate all the claims made for it.

Yours very truly,

Ralph T. Friedmann



Superior auxiliary generating set on "Tamaris" mounted on Hussman spring base

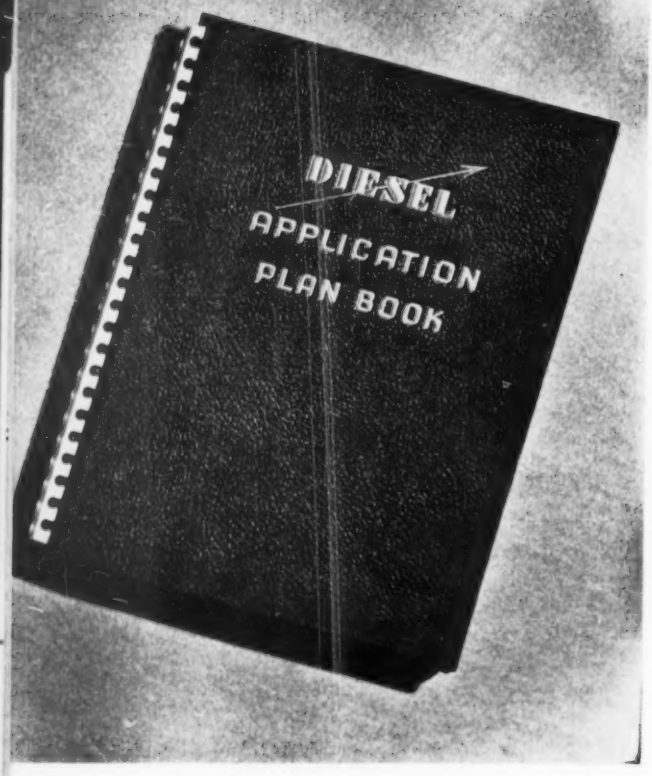


CARL HUSSMAN

Specialist in solving vibration problems

120 SOUTH LA SALLE ST., CHICAGO, ILL.

MR. RALPH FRIEDMANN'S complete satisfaction with Hussman Spring Mountings but typifies the service rendered by these mountings to many, many yacht owners. Every yacht should have all of its auxiliary machinery mounted on Hussman Spring Mountings—the cost is surprisingly low. Hussman Spring Mountings can also be applied with equal satisfaction to main engines for any marine installation. We carefully investigate EACH application, make an individual study, then submit specific drawings and specifications, with a definite guarantee of successful performance. An engineering survey rendering personal service on each and every project.



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94 Elevator and Conveyor Drive
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97 7 Ton Locomotive
98 650 hp. Tug
99 Beam Trawler
100 300 hp. Tug
101 2000 kw. Factory Power Plant
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103 480 ft. Tanker
104 30 Ton Locomotive
105 Semi-Portable Compressor Unit
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Enter my order for a copy of the DIESEL APPLICATION PLANBOOK, Volume One, for which I enclose $2.00—it being understood that shipment will be made, postage prepaid, immediately.

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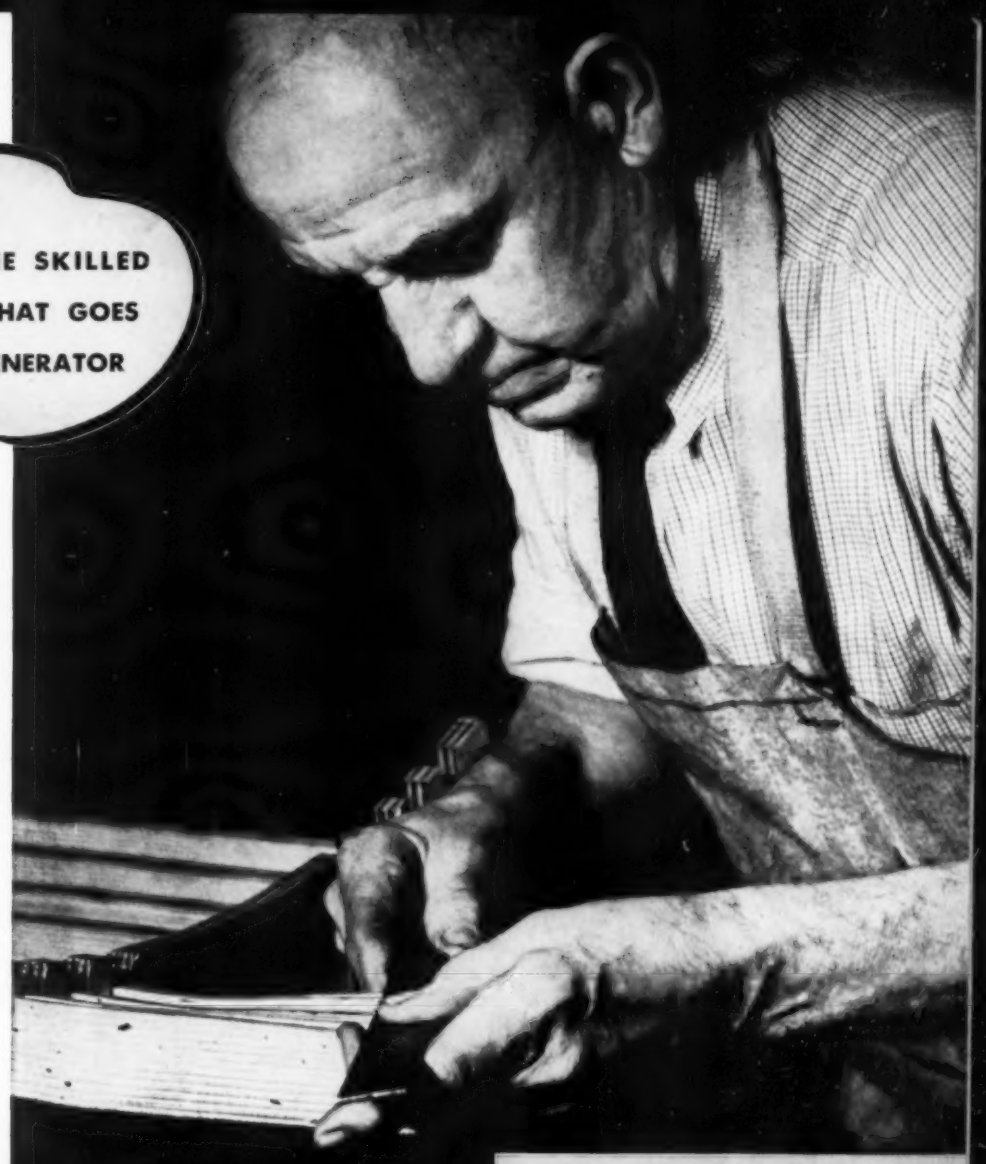
ANOTHER
EXAMPLE OF THE SKILLED
CRAFTSMANSHIP THAT GOES
INTO EVERY G-E GENERATOR

How Bob Rea CHECKS PITCH of Each Coil He Forms

His Skill Helps Build Long Life Into G-E Generators



ROBERT J. REA

After 26 years of experience with coils and insulation, Bob Rea may well be regarded as a master craftsman in his work. He takes well-founded pride in the fact that he knows G-E coil and insulation practice from A to Z.

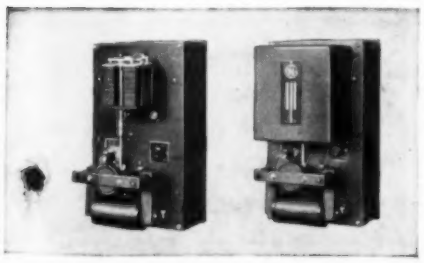
Like many other G-E workmen, Bob Rea owns his home, has a flourishing garden. Most unusual of his crops is popcorn. An ardent radio fan, Bob lists "One Man's Family" as his favorite program, with Jack Benny as runner up.

HERE'S how Bob Rea checks pitch of all generator coils he forms in order to make sure that they will fit perfectly into the stator slots. After carefully forming the unvarnished coils, Bob fits them into a dummy having the exact dimensions of the finished stator.

He then carefully measures to see that the coils fit properly so that they will be snug in the slots of the finished machine. Thus he helps make sure that the coils will not become loose in the stator and that they will not change position under stresses from varying loads.

Bob's work is typical of the skilled craftsmanship that goes into G-E generators. Pride in such craftsmanship on the part of the men who build such equipment is one of the best assurances of a generator that will give dependable performance and require little maintenance. Remember the careful workmanship of Bob and his fellow craftsmen when you specify generating equipment.

For information on any type of electric equipment, write General Electric, Schenectady, N. Y.



G-E generator voltage regulators, with and without case. Ask for Bulletin GEA-2022

G.E. can supply any size or type of cable. Write at once for a free copy of "How to Select Insulated Cable"

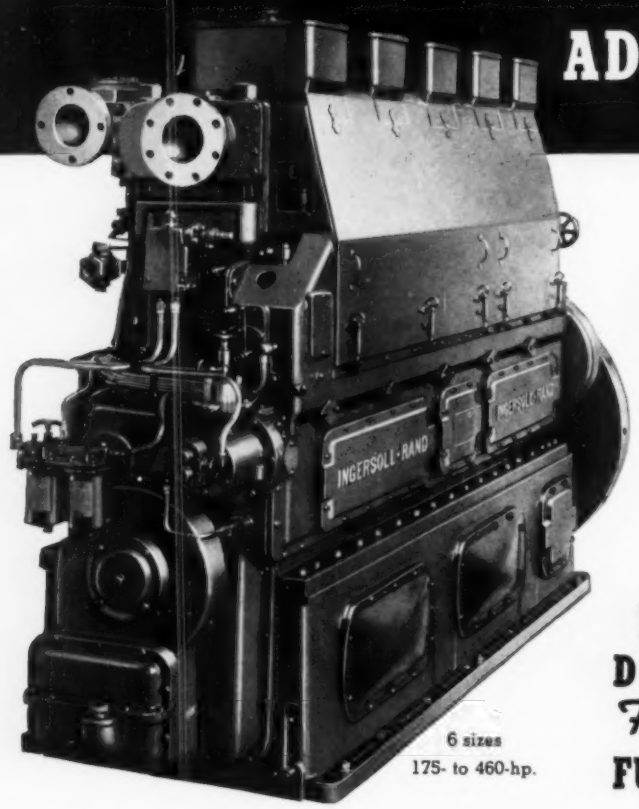
Ten G-E generators, rated 312 kva each at 400 rpm, which are installed in a power station in the Southwest

G-E switchboard controlling the 10 generators at left. General Electric can supply complete electric equipment

GENERAL ELECTRIC

040-56

SMALL PARTS PROVIDE MANY ADVANTAGES



6 sizes
175- to 460-hp.

The Type **S**

HEAVY-DUTY DIESEL-ENGINE *For Continuous* **FULL-LOAD** *Service*

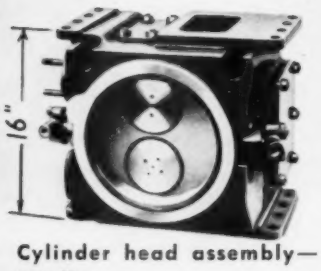
● For a heavy-duty engine, the Type S is unusually compact and has small parts of comparatively light weight. These advantages are obtained by features such as the efficient Type S combustion system and the 600-rpm. operating speed, coupled with exceptional metallurgical facilities and 20 years experience in building solid-injection, 4-cycle Diesels.

Small parts and compactness with complete accessibility, make it easy to inspect and service the engine. All usual repair jobs can be handled by a ½-ton chain hoist. Furthermore, when head room is at a premium, only 14½ inches need be allowed for pulling pistons.

Small parts can be replaced at a lower cost than those for larger engines. Likewise transportation costs and the investment in the usual spare parts are lower.

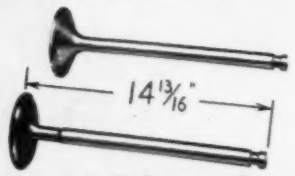
With small parts the distance from the heat centers to the cooling water is shorter. This assures more uniform temperatures and longer life of parts.

Send for your copy of the New Bulletin 10110. It illustrates the above points as well as the full force-feed lubrication system and how the Type S attains the extremely low fuel consumption of .38 lb. per b. hp.-hr.

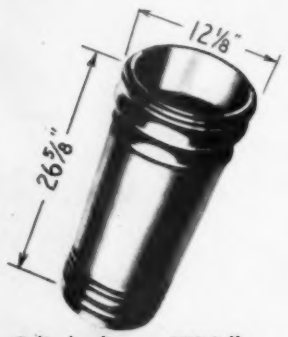


Cylinder head assembly—310 lbs.

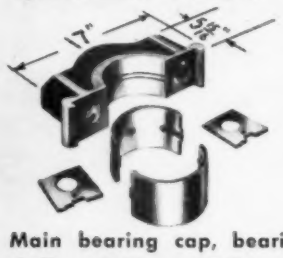
2 valve rocker arms, rocker pin and rocker bracket—26 lbs.



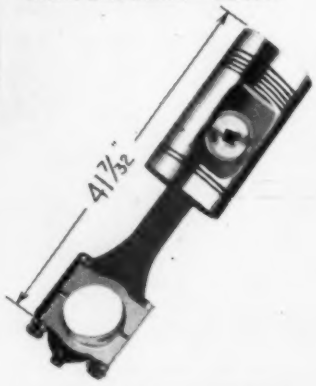
Inlet and discharge valves—5.5 lbs. each.



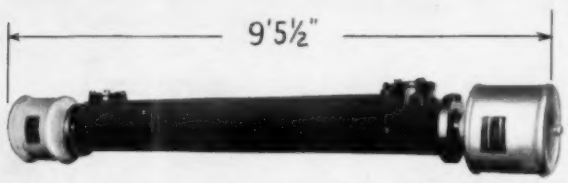
Cylinder liner—132.3 lbs.



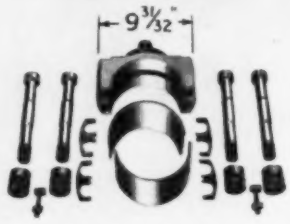
Main bearing cap, bearing shells and shims—52 lbs.



Piston and connecting rod assembly—252 lbs.



Air intake and water outlet manifold for 5-cylinder engine—460 lbs. Filters—12 lbs. each. Weights of manifolds for other engines are proportional. Those for 6-, 7- and 8-cylinder units are made in two sections.



Connecting rod bearing cap, shells, shims, studs, nuts and locking devices—43.5 lbs.

Atlanta
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Boston
Buffalo
Butte
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Dallas
Denver
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Duluth
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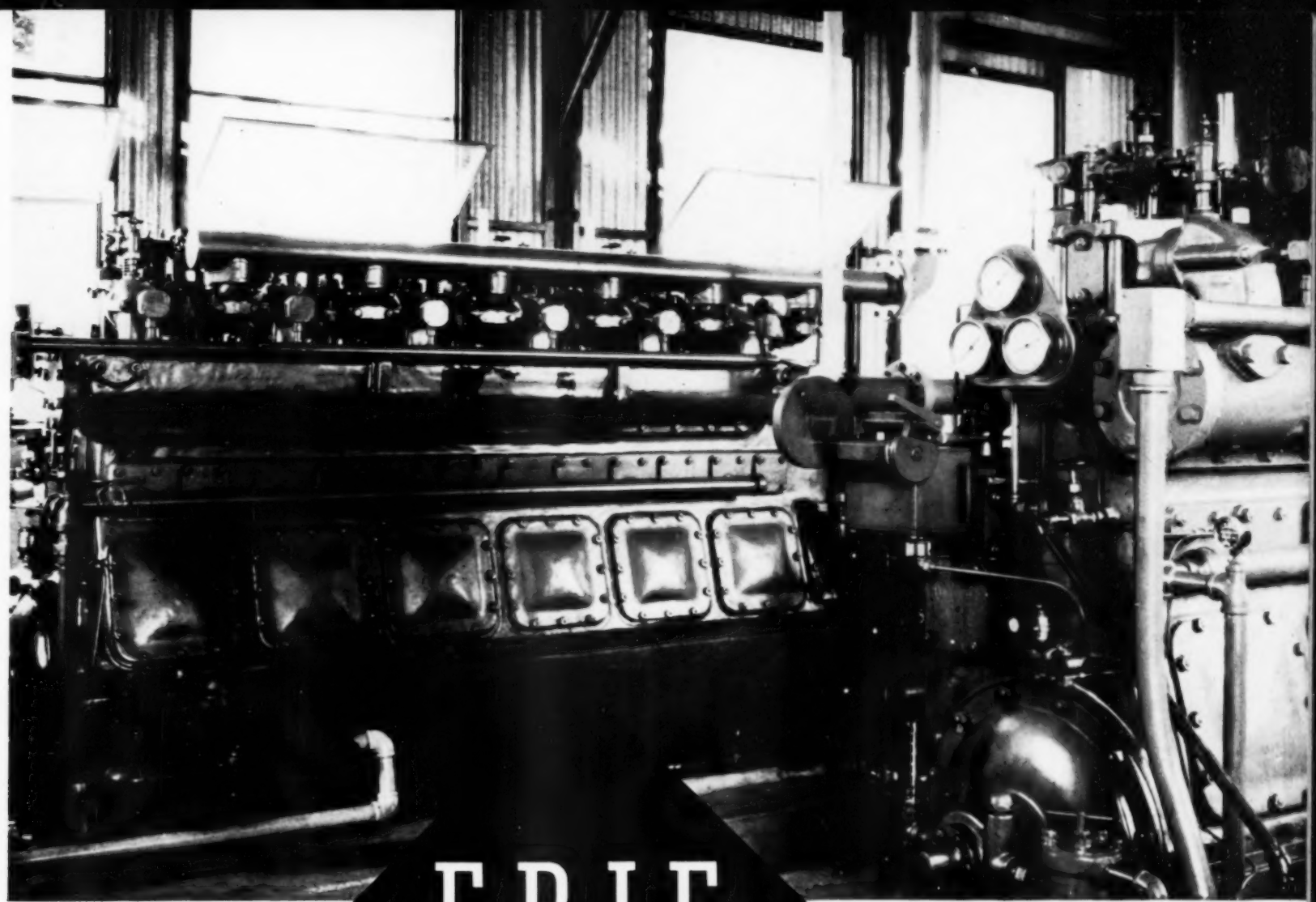


ERIE

Erie crankshafts are in use in this Worthington Pump and Machinery Corporation installation on Orcas Island. Just another example of the confidence placed in Erie crankshafts by leading engine builders.

The repeated use of Erie equipment by all leading Diesel engine builders, over the many years of Diesel engine use in this country, is proof evident of their high quality and accurate finish.

Rough and finished connecting rods, piston rods, crossheads, generator and extension shafts for all Diesel engines. Prompt delivery on all major forged or cast steel elements required in every type of construction.

ERIE FORGE CO., ERIE, PENNSYLVANIA

"ARIES"

59′ O. A.—54′ W. L.—16′ Beam—5′2½″ Draft.
Owner—Dr. Austin F. Riggs, Stockbridge, Mass.
Designer—Furnans Yacht Agency, Inc., New Bedford, Mass.
Builder—Casey Boat Bldg. Co., Inc., Fairhaven Mass.

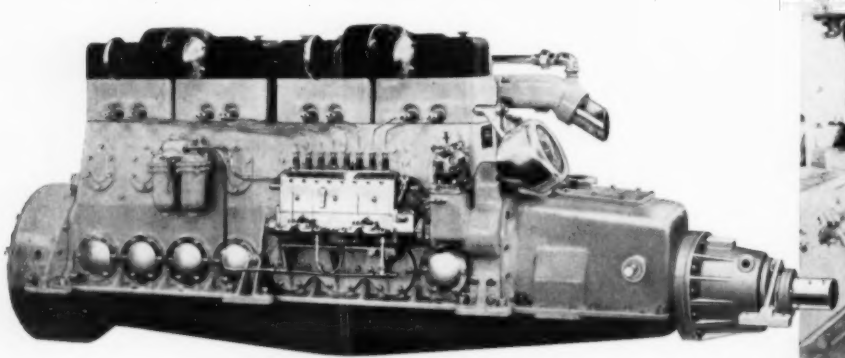
"Aries" A BLUE WATER MOTOR SAILER

Born in the traditional home of deep sea sailors and blue water ships, ARIES bears glowing testimony to the skill of experienced craftsmen in the design and construction of both boats and engines.

She further characterizes the ever increasing demand for that happy combination of sail and power which makes for complete freedom of action afloat.

The Superior Diesel has, in a large fleet of motor sailers, demonstrated a peculiar fitness for this class of service.

Always ready to take over full responsibility when required, eager to start on the touch of a button, quiet, extremely economical and clean running at all speeds, this engine makes motor sailering a pleasure under every circumstance.



MODEL MRA-8

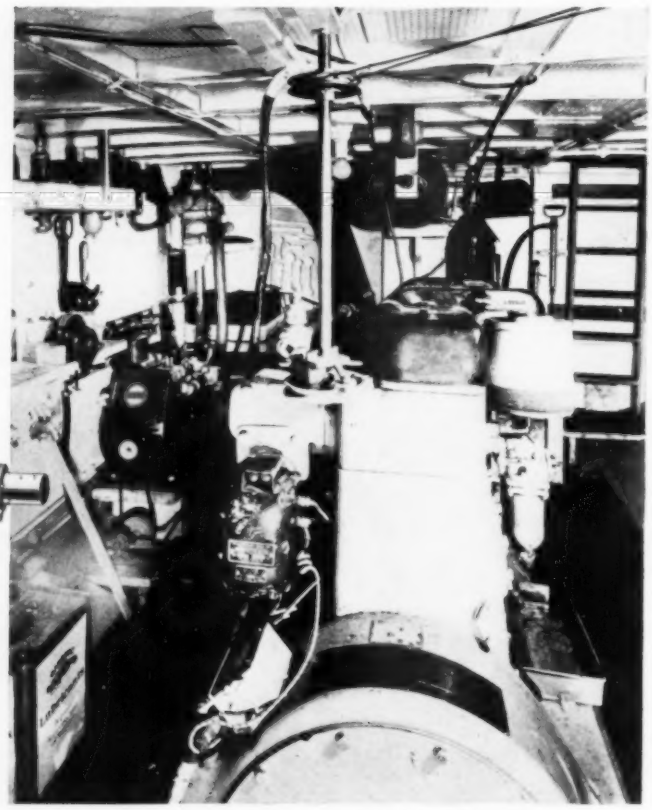
8-cylinder, 4½″ x 5¾″ — 732 cu. in. displ.—150 H. P. at 1800 R. P. M.

Superior DIESELS

HEAVY DUTY MODELS: 50 to 810 H. P. 250 to 720 R. P. M.

111

HIGH SPEED MODELS: 15 to 230 H. P. 900 to 1800 R. P. M.



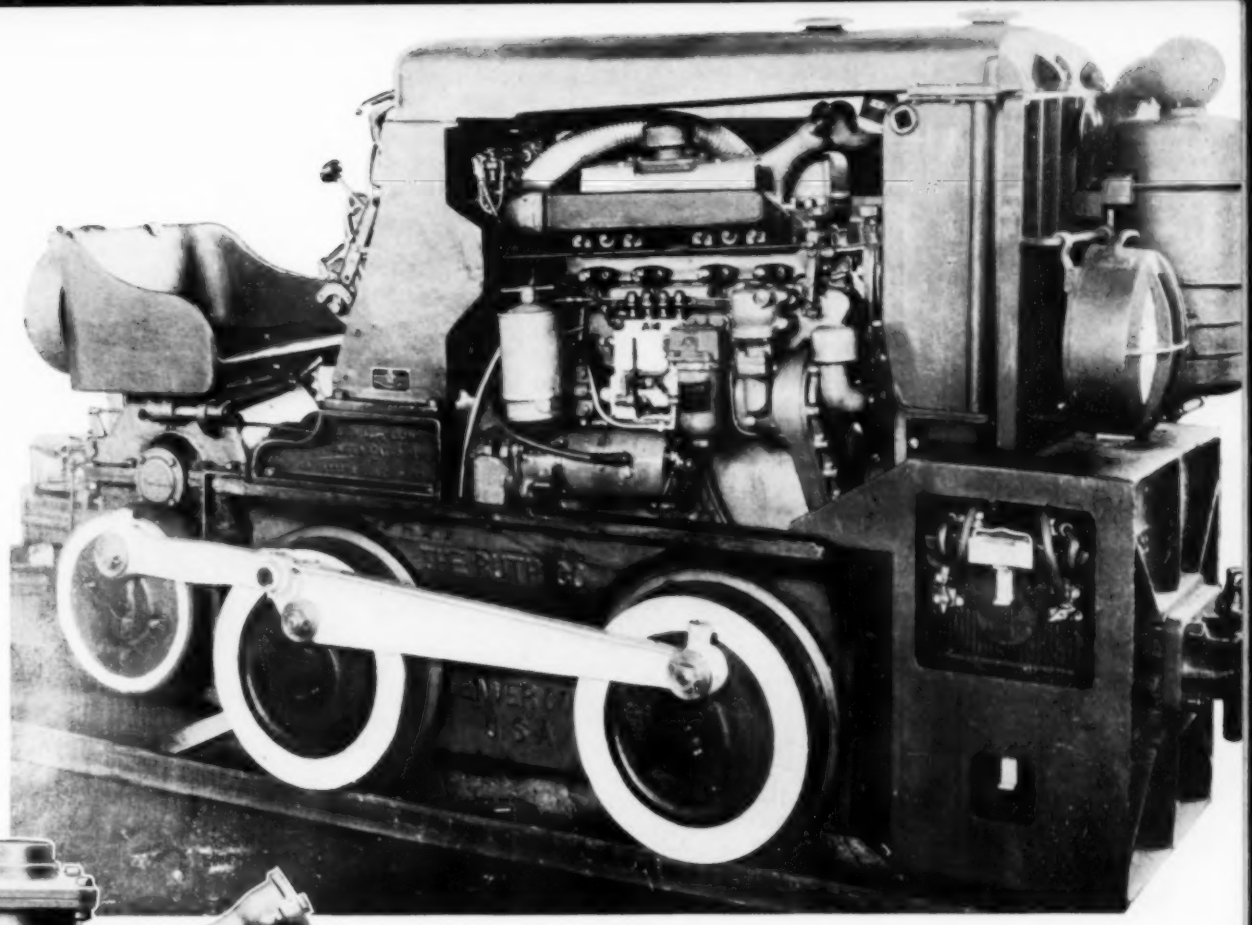
ENGINE ROOM OF THE "ARIES"

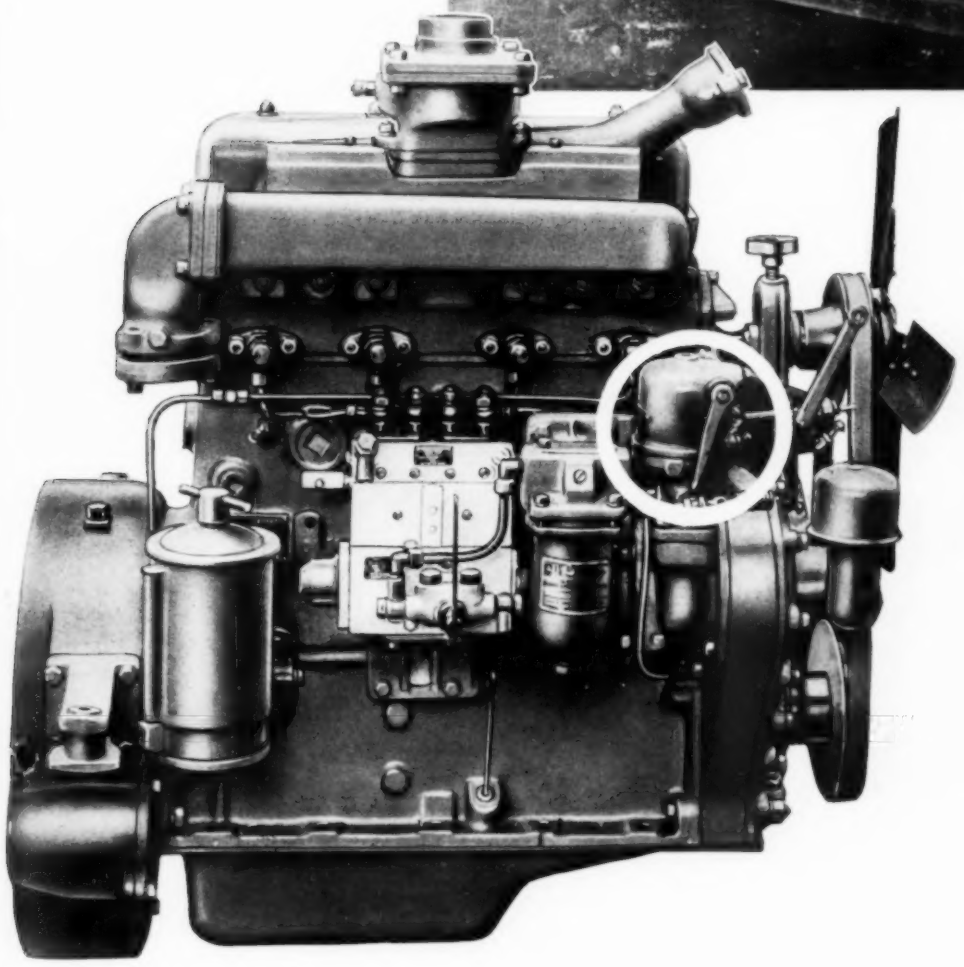
The engine turns a 36″ diameter by 30″ pitch propeller at 600 R. P. M. through a 3 to 1 Reduction Gear.

THE NATIONAL SUPPLY COMPANY . . . SUPERIOR ENGINE DIVISION

FACTORIES: Springfield, Ohio; Philadelphia, Pa. · SALES OFFICES: Springfield, Ohio; Philadelphia, Pa.; New York, N. Y.; Los Angeles, Calif.; Houston, Texas.

THE Ruth Company of Denver, Colorado, has been building mine locomotives for a great many years. They have now developed a very satisfactory underground Diesel mine locomotive and have standardized on the Buda-Lanova 4-cylinder, Model 4-DT-196, and this Buda model, as are all Buda Diesels, is equipped with a Pierce Governor.





PIERCE GOVERNORS

THE fact that Pierce Governors are installed on all Ruth Mine Mules as standard equipment is just another instance of the general trend amongst Diesel engine builders and users to standardize on Pierce Governors. Pierce Governors are designed to meet the particular requirements of each Diesel engine builder. Being of the centrifugal (flyball) type, they respond instantly to each change in the engine.

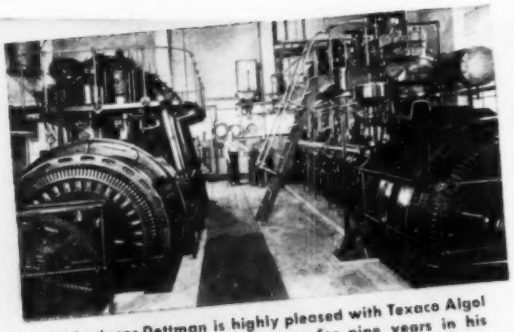
THE PIERCE GOVERNOR COMPANY
1600 OHIO AVENUE, ANDERSON, IND.

PIERCE GOVERNORS
STANDARD SINCE 1913

For Dependable Performance—Choose Pierce

NOT ONE STUCK RING

...in 9 Years!



Chief Engineer Dettman is highly pleased with Texaco Algol and Ursa Oils. He has used them for nine years in his Nordberg, Worthington, and Busch-Sulzer Diesels . . . and reports "no wear."

This Worthington Diesel has been lubricated exclusively with Texaco Ursa and Texaco Algol since 1929. No shims have ever been removed.

From Mr. Dettman's letter:

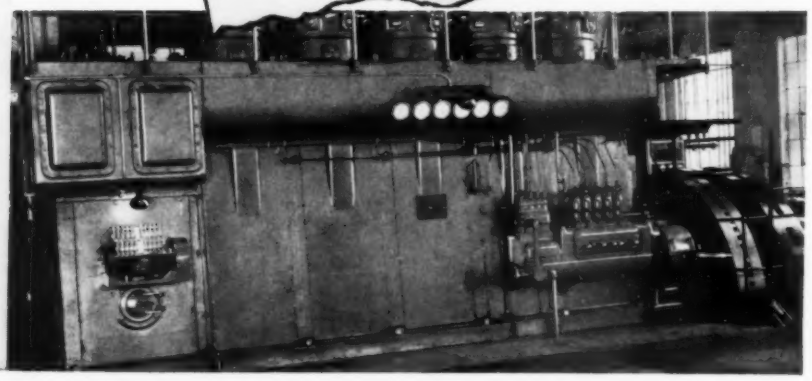
"Our plant consists of two Nordberg Diesels, 1,100 and 550 b.h.p., one Worthington 900 h.p., and one Busch-Sulzer 260 h.p.

"The Nordberg 550 h.p., the Worthington and the Busch-Sulzer have been lubricated with Texaco Ursa and Algol Oils since 1929.

"The Nordberg 1,100 h.p. has been using Ursa heavy and Algol since installation in August 1936.

"All of the above units are averaging about 7,000 h.p. hrs. per gallon.

"In all these years with Texaco lubrication, we've not had one frozen ring. No shims have ever been removed from the bearings as there was just no wear."



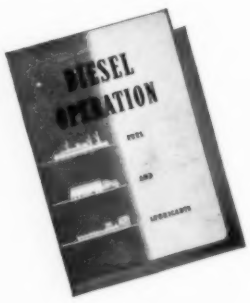
This 1,100 h.p. Nordberg is the latest and largest in this plant. It has been in service for two years. Texaco Algol and Ursa Oils keep its rings and valves free, pistons unmarked by blow-by, bearings free from wear.

READ WHAT Chief Engineer Dettman, of Rochelle, Illinois, says about Diesel lubrication with Texaco Algol and Ursa Oils. Then you will realize why—

More stationary Diesel horsepower in the United States is lubricated with Texaco than with any other brand.

There are 2186 Texaco warehouses in the United States. To get the kind of service that Engineer Dettman speaks of, phone the one nearest you.

The Texas Company, 135 East 42nd Street, New York City.



NEW . . . *Just out. Texaco's treatise for Diesel operators. 80 informative pages, illustrated with charts, diagrams, phantom drawings. Write for your free copy today.*

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment—Every Wednesday Night—Columbia Network—9:30 E.S.T., 8:30 C.S.T., 7:30 M.S.T., 6:30 P.S.T.

TEXACO

Algol and Ursa Oils FOR DIESELS

DIESEL PROGRESS

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REX W. WADMAN
Editor and Publisher

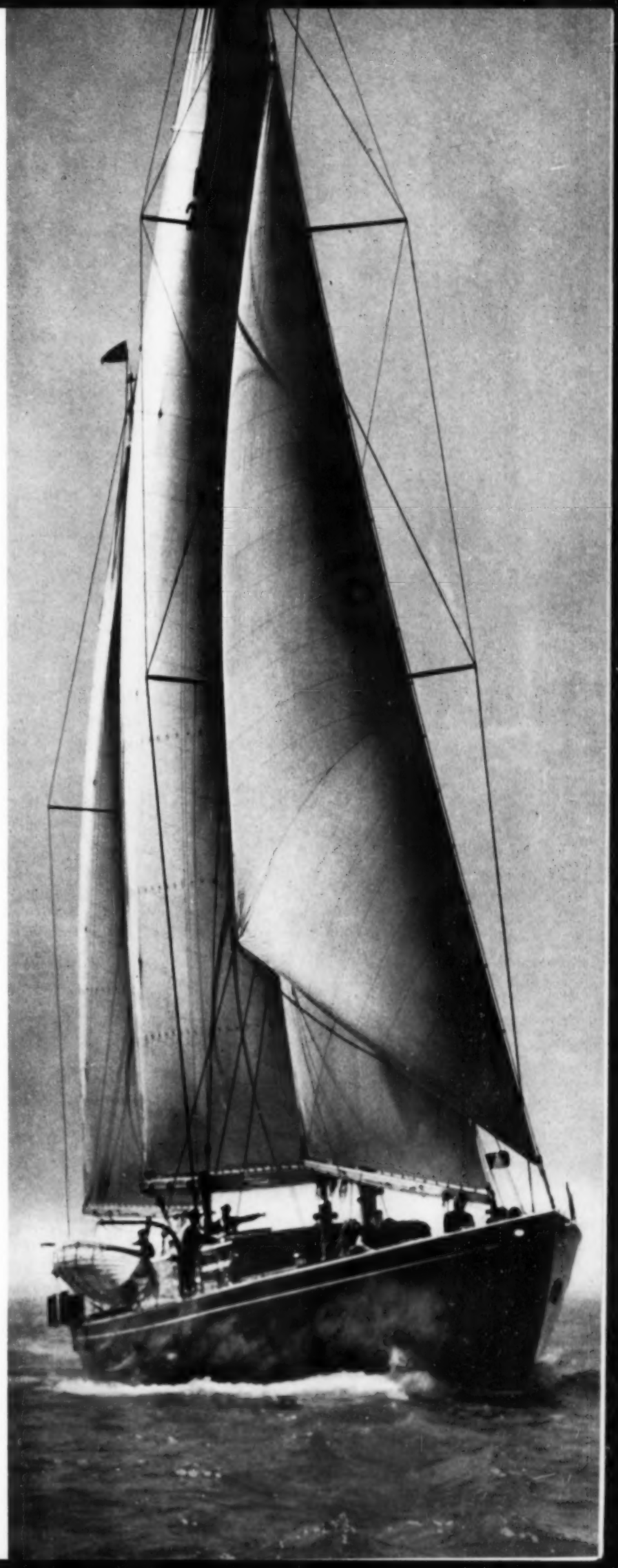
FRONT COVER ILLUSTRATION: One of five Caterpillar Diesel tractors, owned by Charles E. West, San Marino, California, operating on Highway 101, north of Santa Barbara.

TABLE OF CONTENTS ILLUSTRATION: Diesel Ketch *Tamaris*, powered with two 150 hp. Superior Diesel engines. See article on pages 18, 19 and 20.

DIESEL PROGRESS for November, 1938, Vol. IV, No. 11. Published monthly by Diesel Engines, Inc., 2 West 45th St., New York, N. Y. Tel. MUrray Hill 2-5092. Subscription rates: U.S.A. and Possessions $3.00 per year; 25c. per copy. All other countries, $5.00 per year; 50c. per copy.

B. J. VON BONGART
Technical Editor

CCA



"TAMARIS"

By REX W. WADMAN

TAMARIS strikes the latest note in steel auxiliary ketches. She was built for Ralph T. Friedmann, Milwaukee yachtsman, by the Burger Boat Company of Manitowoc, Wis., from designs by Phil Rhodes of Cox & Stevens. Overall length 81 ft., waterline length 65 ft., extreme beam 20 ft. 3 in., powered with a pair of 150 hp. Superior Diesel engines and a 10 kw. Superior auxiliary generating set mounted on a Hussman spring base. Speed 12¾ mph. under power with engines at 1,650 rpm.

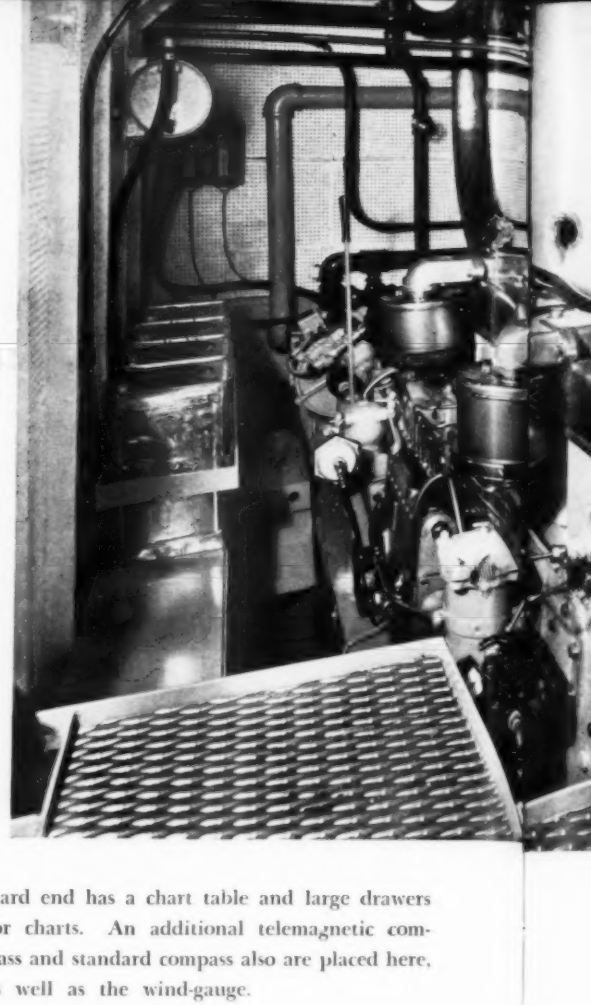
This able ketch is unique in many respects. In design, construction and appointments, she departs considerably from the usual auxiliary. While primarily a sailing yacht in appearance and performance, her twin screws turned by the 300 hp. Diesels supply ample power under any conditions.

Plans show a ketch rig, moderately canvassed, but so well designed her sailing performance will allow competition with the best. The hull has a generous freeboard and beam with canoe stern and an easy sheer. To get the very utmost out of her, Phil Rhodes ran tank tests on a hull model at the Stevens Institute . . . a practice justified by only a 3 per cent error between the designed speed and actual speed under power. In both power and sailing runs, she more than came up to the expectations of the owner, builder, and designer. The power runs showed a remarkably low fuel and lube oil consumption, very pleasing to the owner. To counteract the usual condensation in steel vessels and to effect good insulation in the way of heat and sound, a 2-in. layer of cork lined the entire hull, as well as the four bulkheads.

Boat equipment consists of two nested Dyer dinks hung from the starboard davits and a 14 ft. power tender on the port davits. A Balsa liferaft serves as additional safety equipment.

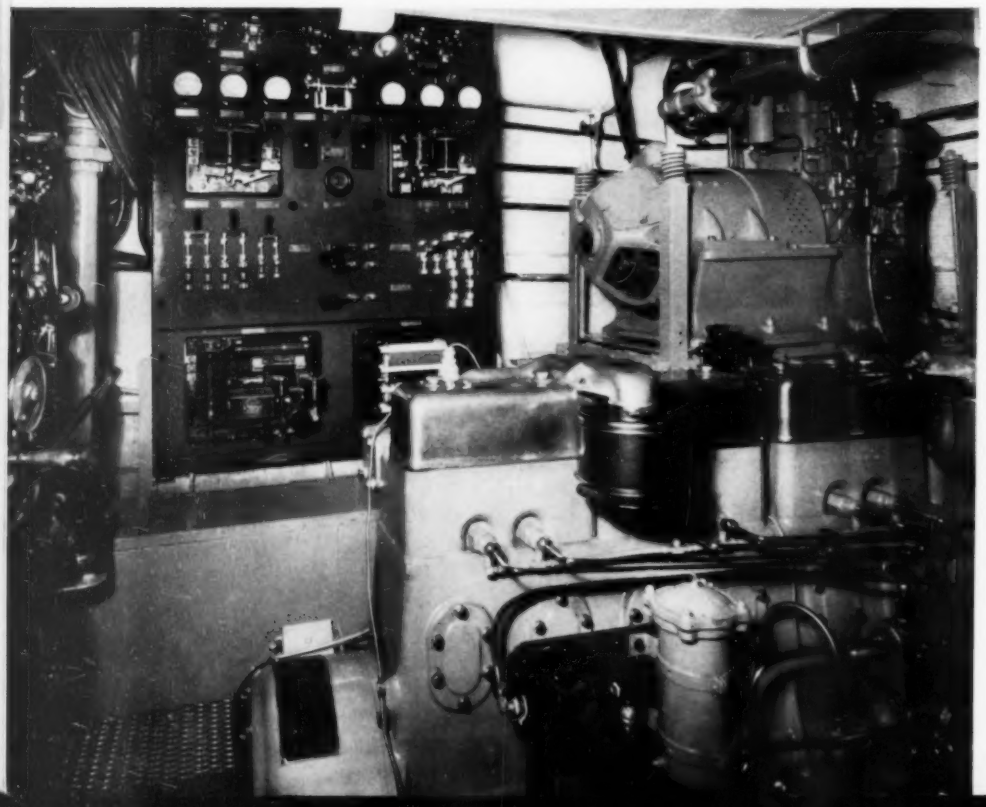
The profile plan of *Tamaris* shows a low deckhouse amidships, with the navigating cockpit just aft, and directly forward of the mizzen. A waist-high, semi-circular teak rail surrounds the cockpit, which has a cushioned seat running around the inside for the comfort of the guests. The wheel is set at standing height, is flanked with Bendix engine controls and the binnacle stands in its usual place just forward of the wheel. All the engine gauges, Kenyon log, telemagnetic compass and clock are set in a panel in the after bulkhead of the deckhouse . . . all within full view of the navigator or wheelsman. The deckhouse is at a level to permit the wheelsman a clear view forward of the water or forward deck.

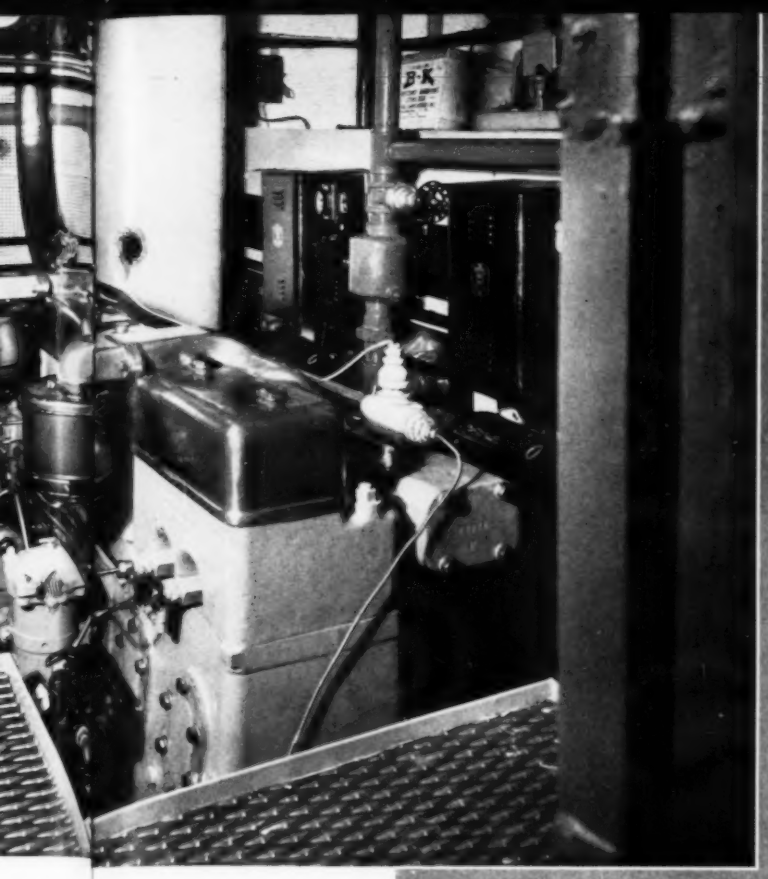
The deckhouse with its full rounded top, nicely styled, is entered from the cockpit by means of a protected companionway, which has the radio direction finder controls set in one side for the convenience of the navigator. The forward end has a chart table and large drawers for charts. An additional telemagnetic compass and standard compass also are placed here, as well as the wind-gauge.

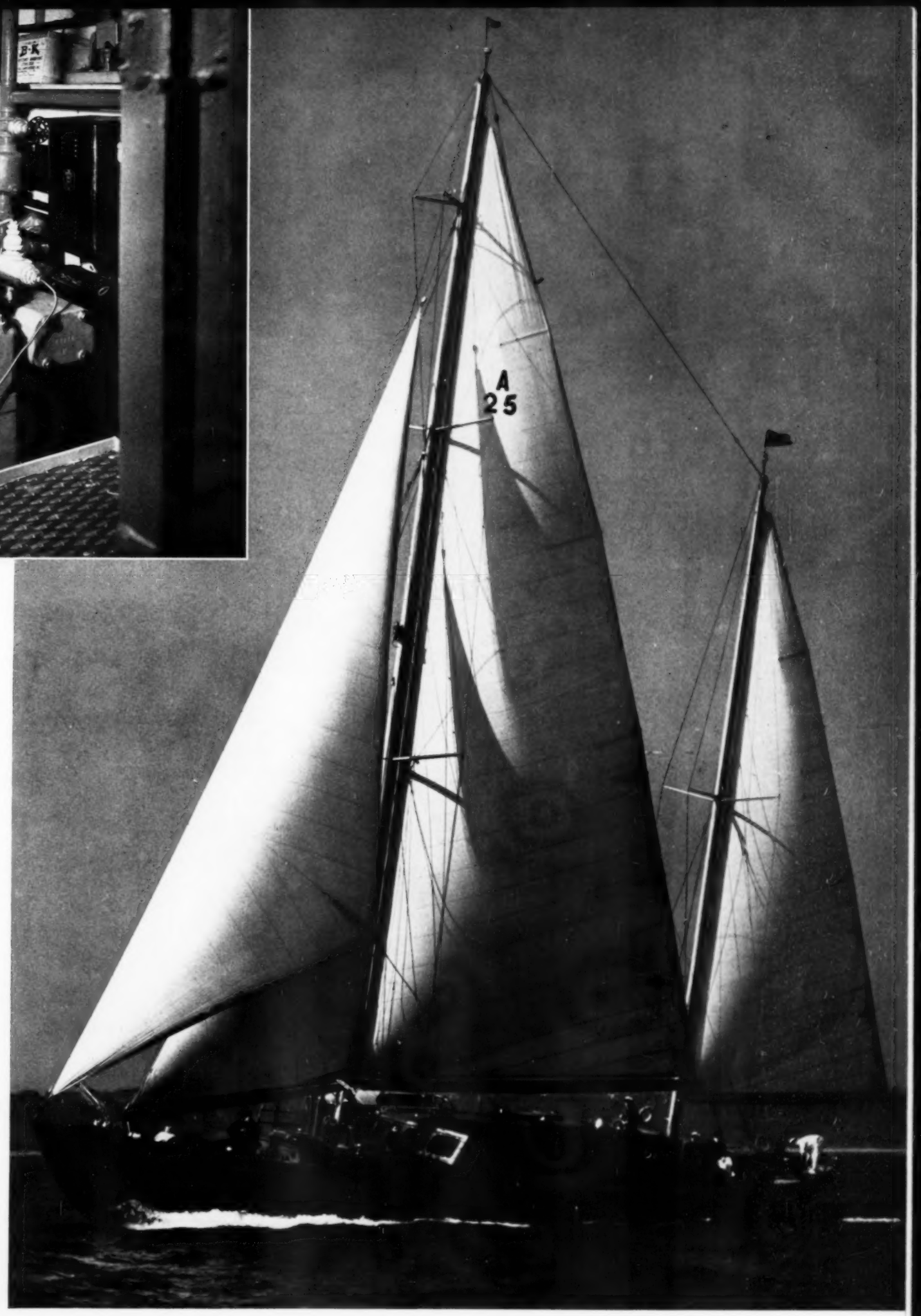


The interior styling of the deckhouse, as was the balance of the interior, was designed by Armin Hanson, Milwaukee artist, in a very modern manner.

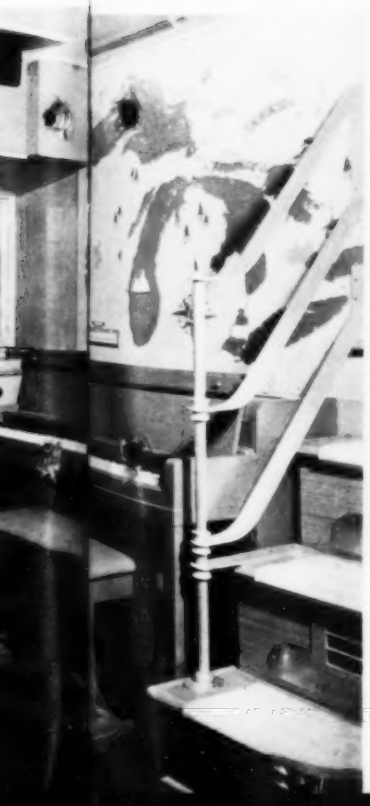
The owner's stateroom is at the end of a passageway, and is done in a soft walnut finish, has two berths, with private bath done in blue and white tile. Several hanging lockers are included below here for owner and guests. There are two single and one double guest staterooms in mahogany and enamel. Guests also have their private bath.







Above—One of the 6-cylinder 150 hp. Superior Diesels. Notice noise isolation material on walls. Below left—Another view of engine room showing 10 hp. Superior mounted on Hussman spring base.



Three interior views of the Ketch "Tamaris" illustrating the beautiful woodwork characterizing this entire vessel.

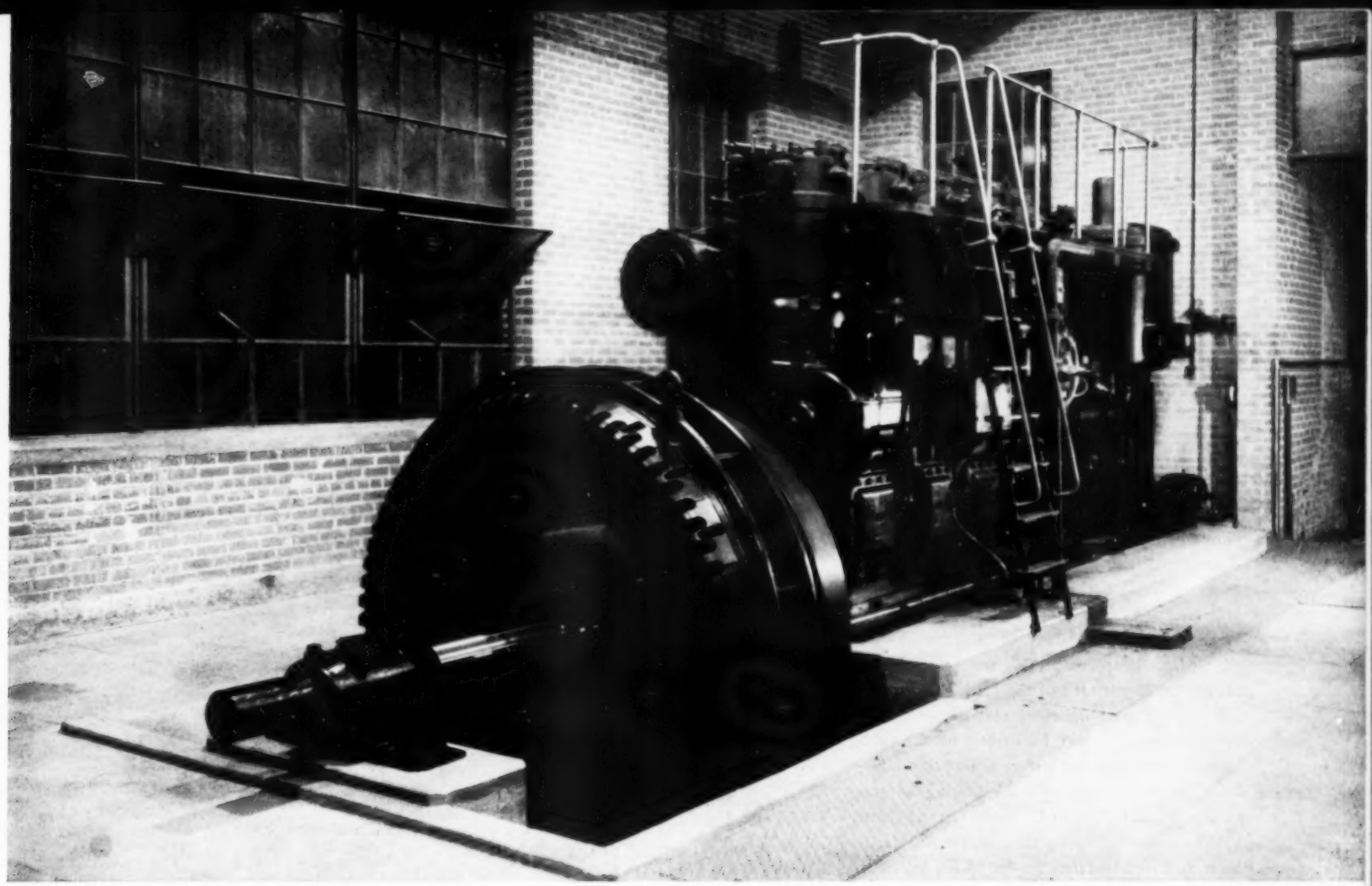
Forward of the deckhouse, a stair with hand-wrought aluminum rail leads to the main saloon and dining room. This is the full width of the ship, and is a delight in an unusual natural finished oak paneling with jade green cushions and rust carpeting.

Forward, to port, is the captain's stateroom, across from which is the crew's toilet and shower. Following is the forecastle, which has four pipe berths and individual lockers for the crew.

Directly under the deckhouse is the engine room, the full width of the ship. It houses the two Superior main propelling engines, the generator, all the electric auxiliary pumping motors and water heaters . . . and a multitude of other engineering gadgets of the most modern type. A large switchboard, so designed as to make electrical checkups very easy.

Navigation equipment is of the very latest and fully complete. Assisting the navigator is first the latest of Kevlin-White's illuminated spherical steering compass, and works in conjunction with several telemagnetic compasses located in the cockpit, deckhouse and owner's stateroom. For positive bearings, besides the standard pelorus, there is a Bludworth radio direction finder. A Kenyon log provides a checkup on sail trimming and power runs.

To insure the maximum of strength and seaworthiness without unnecessary weight, TAMARIS was built to American Bureau of Shipping standards with a rating of +Al. Anyone who has seen this fine yacht must admit that Burgers' executed Rhodes' masterly design in a manner befitting their long experience in yacht construction. It's truly a yacht of beauty and ability.



The new 630 hp. Fairbanks-Morse Diesel engine recently installed at Bowie, Texas.

BOWIE, TEXAS

By ORVILLE ADAMS

THIS town has owned and operated its own light and power plant for so long that every citizen takes it for granted that municipally operated utilities are essential to the existence of the town, the revenues from the Diesel plant supporting entirely such operating departments as the fire, police, street, public parks, and contributing heavily to the administrative expense. In fact, says Mayor F. M. Paire, "we don't know how we would run the town without the light and power plant." Having operated its own utilities for nearly a quarter of a century on Diesel power, no question as to the feasibility of such a policy and the advantages to the city are ever raised, for all the arguments have long been settled by dollar and cents form of proof because, as he says, out of almost every dollar paid for light and power, even on a rate schedule that is as good as any, practically 50 cents comes back to the citizen in net profits which are used to supplement the general fund.

Since the installation of a new 630 hp. F-M Diesel generating unit recently, together with other needed power plant auxiliaries, the city has continued to add modern improvements and adjuncts to more efficient operation, some of the late items including an oil reclaiming filter, a centrifuge, and an Elgin Water Softener. A new cooling tower to take the place of the old spray pond is being built at the present time by the plant engineering force under the direction of Mr. H. R. Davis, chief engineer and superintendent. The new tower will reduce the evaporation and loss of water, and is required in the modernized cooling system which includes the water softener.

According to Mr. W. V. Bates, in charge of the light and water office, the city of Bowie started its municipal power plant program in 1918. The entire program, he tells me, was carried out on a revenue liquidating basis, no Federal loans or tax bonds were ever needed, for revenue funds have always been sufficient to meet the expanding needs and progress of the city. Like many other municipal projects in the smaller towns, this plant was started on a small scale and in direct competition to the large utility net work serving this region. The first modest unit, Fairbanks-Morse 100 hp. generating unit, was installed in 1918, which was followed soon by a 200 hp. F-M unit. The citizens having found the economy good and the service reliable, the plant soon commenced to receive increased patronage, with the result that steady growth has been realized ever since,

the plant furnishing power for the local enterprises, such as cotton gins, including the local ice plant.

By 1934 the plant facilities had grown to meet this demand, the first 100 hp. unit had been traded in on a 300 hp. unit in 1925, and at a later date a 360 hp. unit had been installed, so at that time the total installed horsepower capacity was 860, consisting of one 200 hp., one 300 hp., and one 360 hp. units. The power company competition was still on the streets. However, during 1934 the franchise of the competing power company expired, and the utility made application for its renewal. Therefore, before considering this application, the city officials made a careful study of the entire situation. The chief question involved was the size and capacity of the plant required to take over the load if such a franchise was denied. The plant at this time was already handling 70 per cent of the load. The report of the engineers indicated that the city plant could carry the entire load safely on the existing facilities, but the reserve power or standby capacity would be absorbed, indicating that provisions would have to be made for additional Diesel units to supply these demanded facilities at an early date.

Naturally, no extension of the franchise was granted and in May of 1934 the power company removed their lines from the streets and the city took over the entire load. During 1935, plans were developed for remodeling the power plant building and installing the necessary equipment. Estimates made available to me showed that approximately $60,000 would cover the cost of these extensions. Since the system was out of debt, it was logical that the city should finance the improvements with revenue bonds. This plan was promptly approved by a large majority at an election in favor of the bond issue for this purpose.

Bids were promptly taken and contracts let covering the improvement and additions to the plant. The power house building, a brick structure, had a very low roof, and the head room between the engine cylinder heads and the wood ceiling was insufficient to permit piston removal without considerable difficulties. The power plant building was insufficient, crowded and awkward on account of the arrangement of the engines and auxiliary equipment. The switchboard was inadequate and obsolete, so much so that log sheet data were not available.

These conditions were corrected by rebuilding the plant, enlarging the building, and modernizing the arrangement. New chain hoists were

The new power plant building at Bowie with Maxim Silencer at right.

installed, with provisions for servicing all units. A number of auxiliaries were likewise added, and the entire operation brought up to date.

The latest unit installed is a 630 hp. Fairbanks-Morse Diesel, with oil cooled pistons, and with a direct connected alternator. Scavenging air is drawn through a battery of American Air Filters specially housed in a steel compartment with the intake high above the ground, located outside the building. The exhaust is short and direct and is equipped with a Maxim silencer of the latest type, see illustration.

The engines are equipped with a closed cooling system, from a common source, and supplied by a duplicate set of Fairbanks-Morse motor driven centrifugal pumps. Either pump-

ing unit has sufficient capacity to cool all the engines in the plant. The large open spray pond located adjacent to the plant furnished the atmospheric cooling for the water until the new cooling tower is completed. The cooling system is also connected to the mains for emergency supply.

A complete new switchboard was installed, with the exception of a few instruments on the old board, including the automatic voltage regulator. The panels of the new switchboard are of the late pressed steel design and consist of 4 generator panels and 3 feeder panels with their complement of instruments and controls for accurately registering the data necessary for efficient operation of the plant.

The alternators are provided with separate, motor driven exciters, the latest type Fairbanks-Morse motor-generator sets, each of which has sufficient capacity to excite all alternators in the plant. One belt driven exciter on the 200 hp. unit was left in service, however, to provide excitation in case of emergency.

Chief among the other auxiliaries in the plant are the motor driven air compressors for starting air, and one engine driven air compressor unit, a Gardner-Denver, direct connected through a clutch coupling to a 10 hp. single cylinder, F-M Model 36 full Diesel engine. A motor driven centrifuge for reclaiming lubricating oil is a Goulds Hydroil with electric heating unit.

Among the other important accessories used in this successful municipal Diesel power plant are a Yale & Towne hoist, a Brown pyrometer, and a Wichita Falls oil reclaimer. There is an increasing tendency amongst municipal Diesel plants to add a lubricating oil reclaiming unit because these oil reclaimers have proven money makers and money savers, inasmuch as they remove fuel dilution, acids, water, sludge material and dirt, and restore new oil appearance.

Even oils, which are severely emulsified by water jacket leakage, are salvaged for reuse as new oil. Several manufacturers now produce these oil reclaimers, one of the most popular of which is the Y-M, manufactured by the Youngstown Miller Company, Sandusky, Ohio.

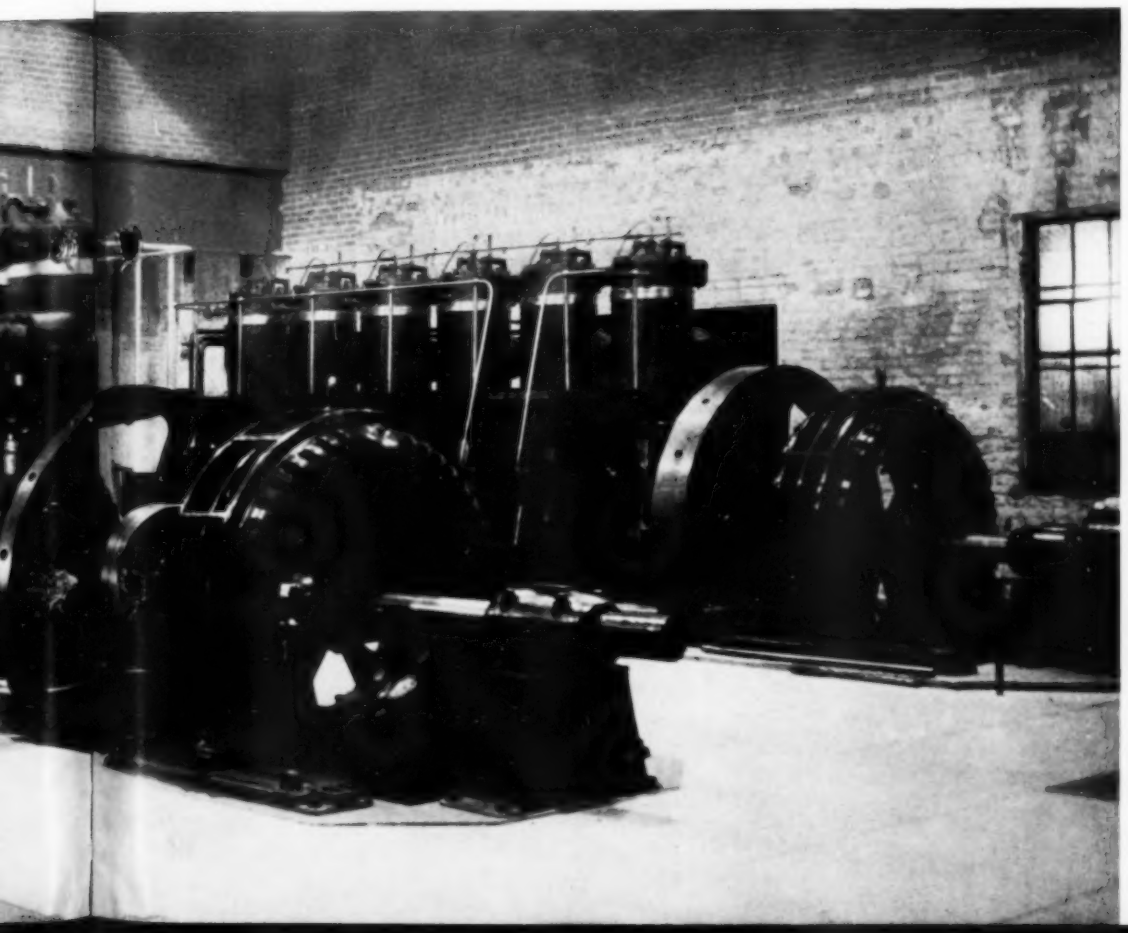
Motor generator sets used for excitation in the Bowie Municipal Diesel Power Plant.

The new 630 hp. engine with its oil-cooled pistons has been in almost continuous operation since it was put on the line, showing excellent mechanical performance. The fuel and lubricating oil economy compares in a striking manner with the older units.

The visitor to the plant is furnished an interesting example of the unbroken and continuous line of development of the Diesel engine in the last two decades and how far the designer and the engineer have come since the close of the last war in the matter of the perfection and application of Diesel engines.

Each of the four units in the plant represents a step by step advance in this development from the 20-year-old 200 hp. semi-Diesel unit to the present oil-cooled piston engine. From this oldest to the latest engine the fuel economy alone has been improved over 35 per cent, while the lubricating oil economy has improved at least 300 per cent. In spite of this amazing development the old engine was and is yet a good serviceable engine that proves the economy as well as the feasibility of Diesel power generation of light and power for municipal purposes.

The idea of the economy of the Diesel has long since been proven to have been fundamentally sound, and this field of its application likewise fundamentally correct, as both the improved engine, and good municipal practice emerges from a quarter of a century of experience. This is concluded by the visitor who has had an opportunity to visit and study this typical example of present practice.



Chief Engineer, H. R. Davis, standing in front of one of the older of his three engines.

The Matthews "50" Sedan "Vagamundo" cruises at a low operating cost of 70 cents per hour.

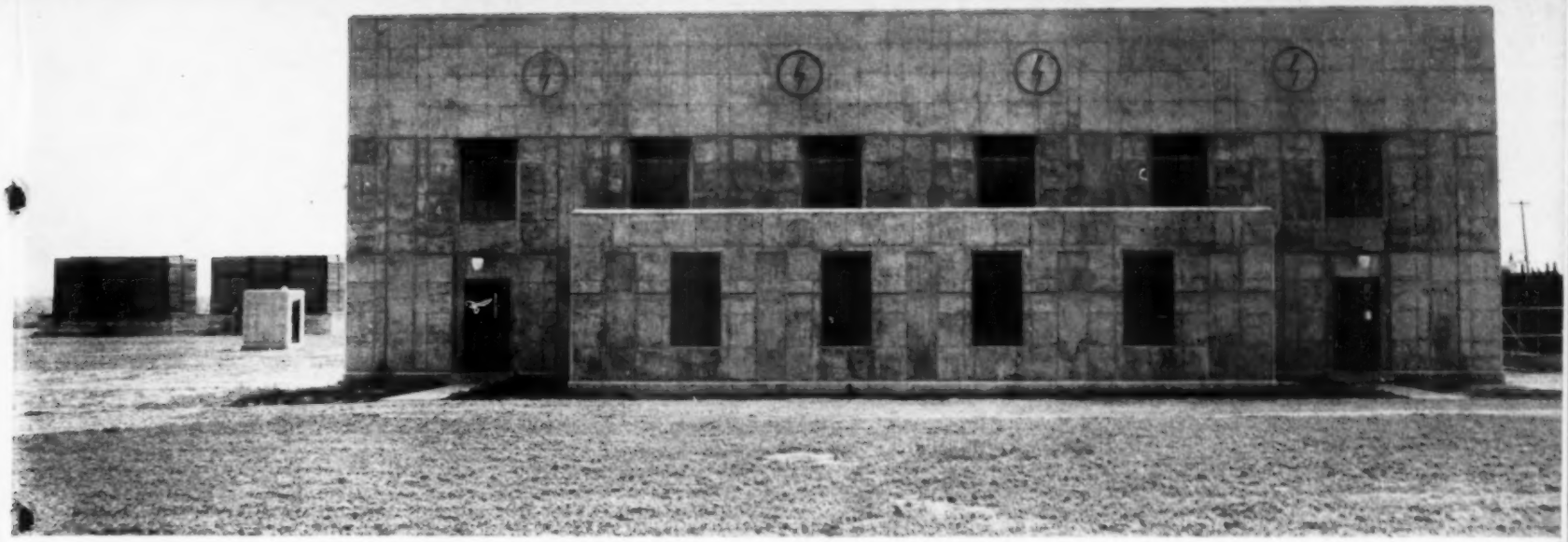
THE FASTEST DIESEL CRUISER

Matthews Fifty Footer Gray Diesel Powered

THE new Matthews fifty-foot sport sedan *Vagamundo* is probably the fastest Diesel powered cruiser, in stock design, yet produced. Powered with a pair of 165 hp. Gray Marine Diesels, she averaged a flat 23½ miles per hour on her trials, run during the Detroit Motor Boat Regatta on Labor Day. She is owned by a well known eastern yachtsman who is taking her down to the West Indies for an extended fishing cruise. She will fly the flag of the Royal Nassau Sailing Club.

Vagamundo is the ninth boat built by the Matthews Company for the owner's family during the past forty-three years. Incidentally, Scott Matthews and the Matthews Company will shortly celebrate fifty years of actively and successfully building yachts at Port Clinton, Ohio. This is in itself quite a record. The two Gray Marine Diesels are based, as you know, upon the engines developed and built by General Motors Corporation, adapted and equipped for marine use by the Gray Marine Motor Co.

Vagamundo is splendidly equipped. Venetian blinds in deckhouse, fish box in after deck, two Matthews "Fishinchairs," three radios, (one short wave), radio direction finder, electric windlass, Bendix Holmes automatic compass, a large spherical compass, – everything necessary for the owner's comfort and safety. The typical operating economy of her two Gray Marine Diesels gives this fast yacht a cruising capacity of nearly 1000 miles on a fuel tank capacity of 550 gallons.



Exterior of Pocahontas Diesel Plant with Marley cooling tower to the left.

POCAHONTAS, IOWA

Another R.E.A. Project

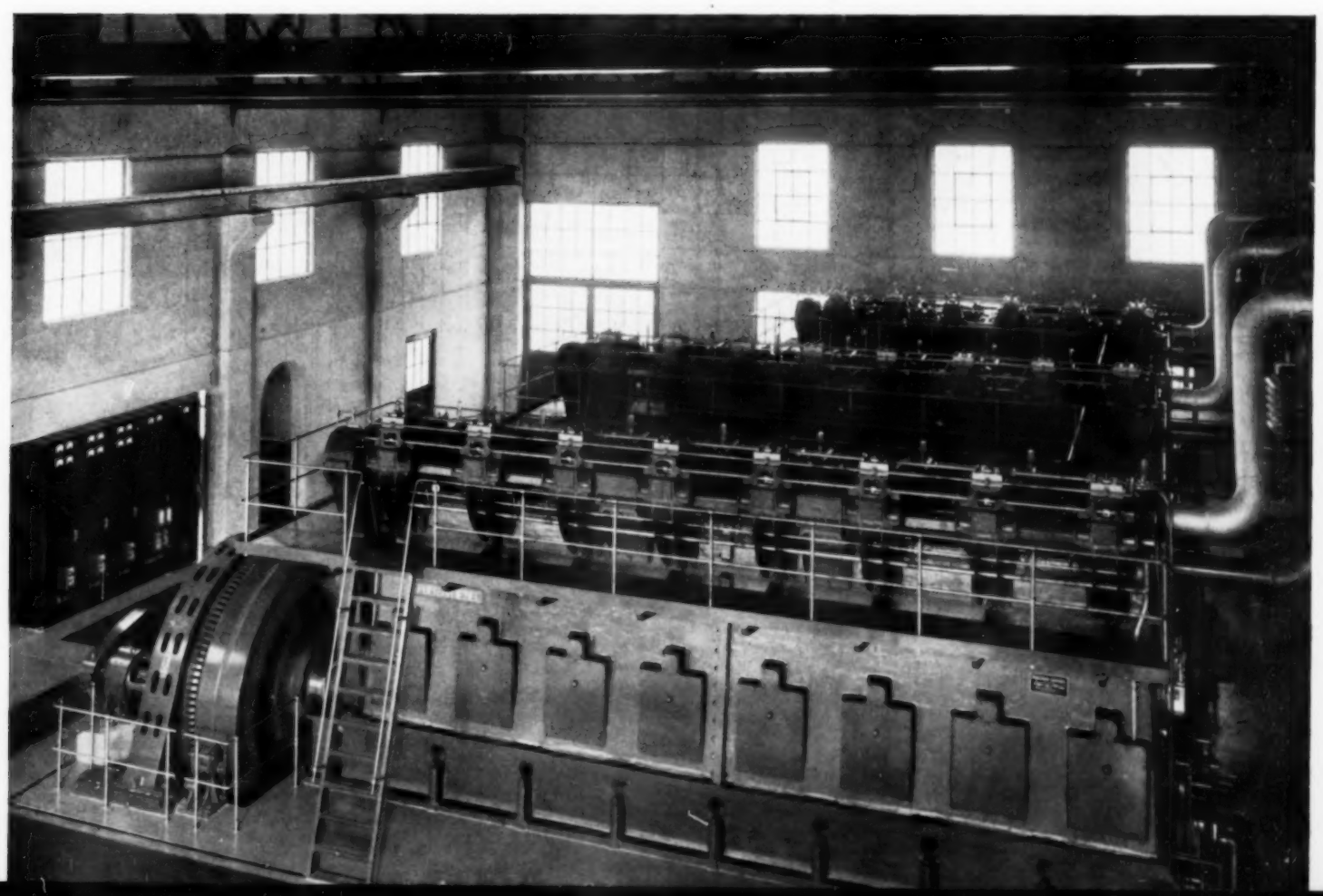
By RAYMOND B. DOBBS*

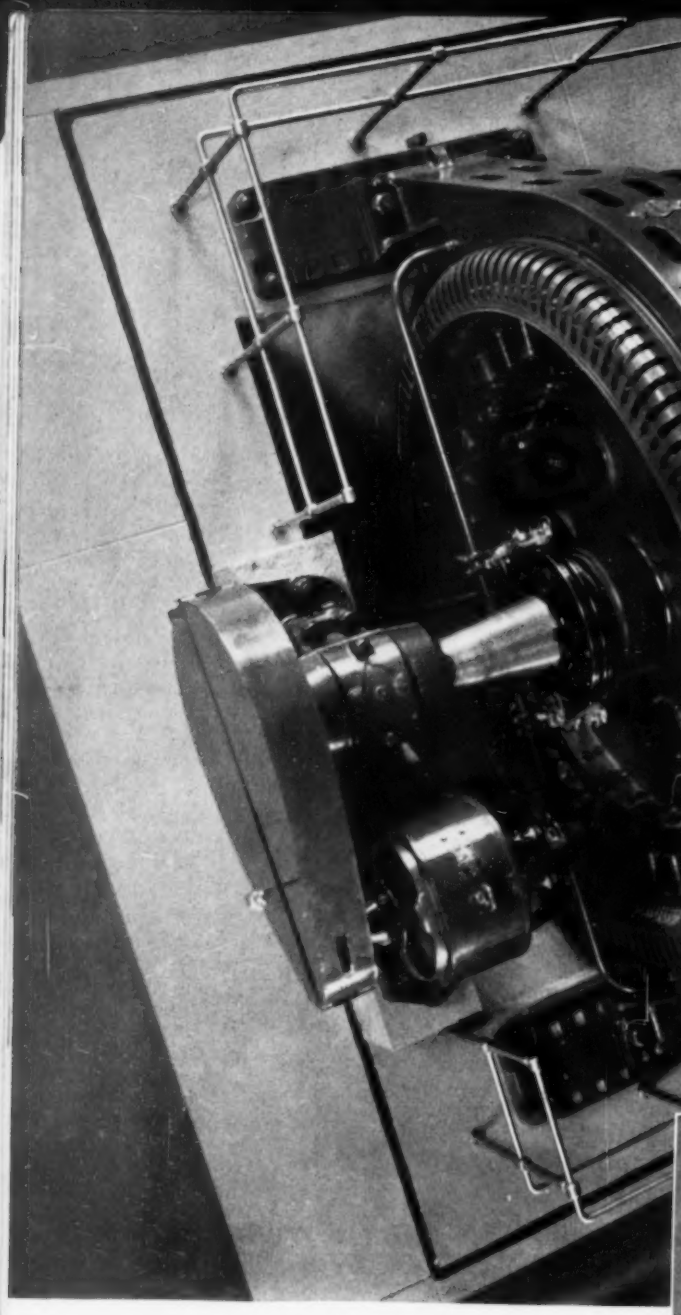
AT Pocahontas, Iowa, the Central Electric Federated Cooperative Association is now operating the largest R.E.A. generating plant so far built under the financing plan of the R.E.A. Its present capacity is 2,750 hp. and its ultimate capacity will be 4,750 hp.

The building is of Monolithic type concrete designed by Young & Stanley, Inc., of Muscatine, Iowa. The overall dimensions are 98′ x 86′ x 30′. The engine and generator room is 98′ x 56′. The present generating equipment consists of three Fulton four stroke cycle, mechanical injection Diesel engines operating at 225 rpm. Unit No. 1 is a six cylinder 750 bhp. engine, and units 2 and 3 are eight cylinder

*Superintendent, Central Electric Federated Cooperative Association.

General engine room view, showing two large Fulton Diesels in foreground, and smaller unit in background.





Airplane view of one of the 875 kva. Electrical Machinery generators.

units of 1,000 bhp. each, with a piston bore of 17½ in. and stroke of 24½ in. The three units are identical in every respect except, of course, in number of cylinders, which permit an interchange of spare parts and repairs

The generators are made by the Electrical Machinery Manufacturing Company and are rated at 875 kva. The generators on the two large units are rated at 80 per cent P.F. and on the small unit at 60 per cent P.F. This type of rating was decided upon with the idea of using the small unit at such times when the power factor was abnormal.

The exciters are shunt wound, silent chain driven.

In the plans of the building, provision was

made for the future and space was provided for the addition of two more units should the load warrant.

The switchboard is of the unit type cubicle, assembled by the Delta Star Company, with G.E. type GDA carbon file regulators for voltage control. The generators are connected in Star. The outside transformers are G.E. 500 kva. each with a Y hookup.

The building will be heated by low pressure steam supplied from the waste-heat boilers on each exhaust. These are Foster-Wheeler boilers. They are designed to permit operating dry, and act as silencers in the summer months.

The cooling system is Marley, closed type with copper tube heat exchangers. The jacket and raw water pumps are Dayton-Dowd single suction pumps driven by Westinghouse motors.

Delta Star switchboards at Pocahontas.

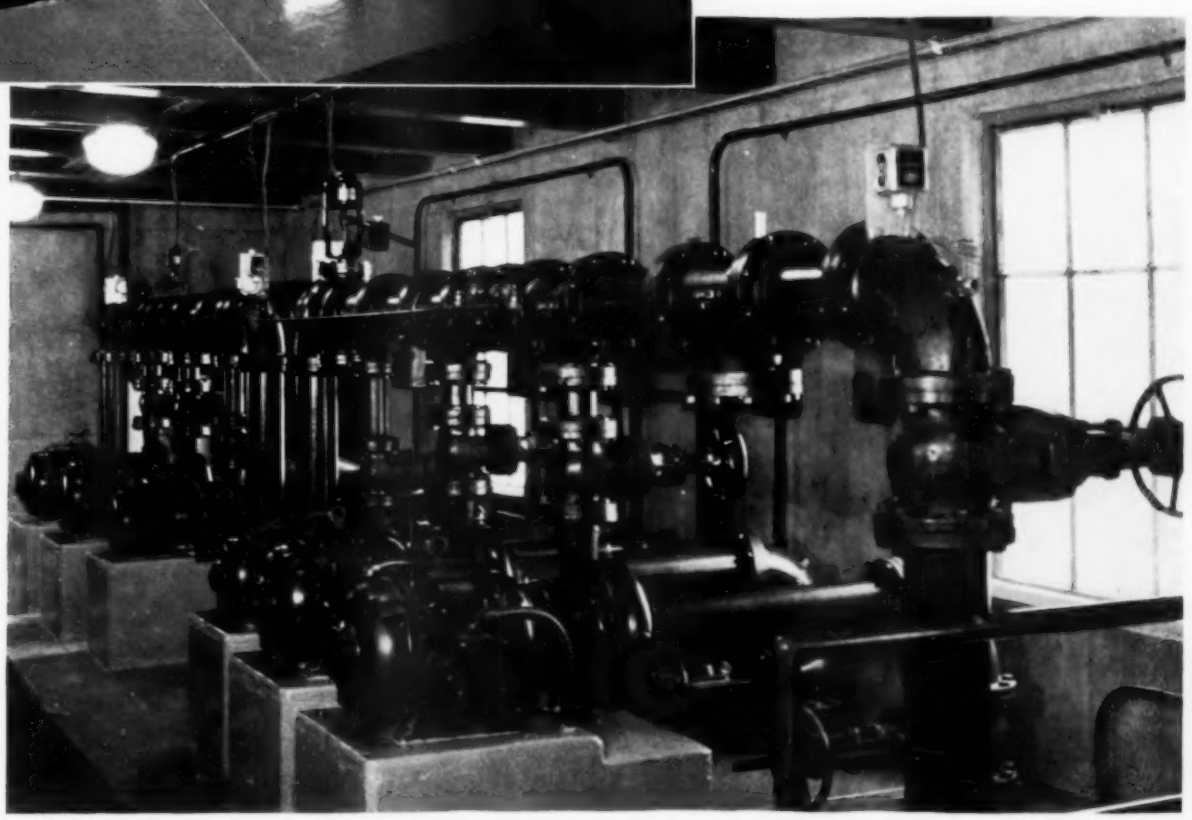
Goulds Hydroil centrifuges are used for cleaning the fuel and lubricating oil.

The control panel is equipped with the Edwards alarm system. All of the Brown pyrometers and telegauges, as well as pressure gauges, are on this panel. All pump motors, centrifuges, air compressor, deep well pump have push button control located on this panel as well. These different auxiliaries have indicating lamps so an operator can tell which pump or motor is running without leaving the engine room.

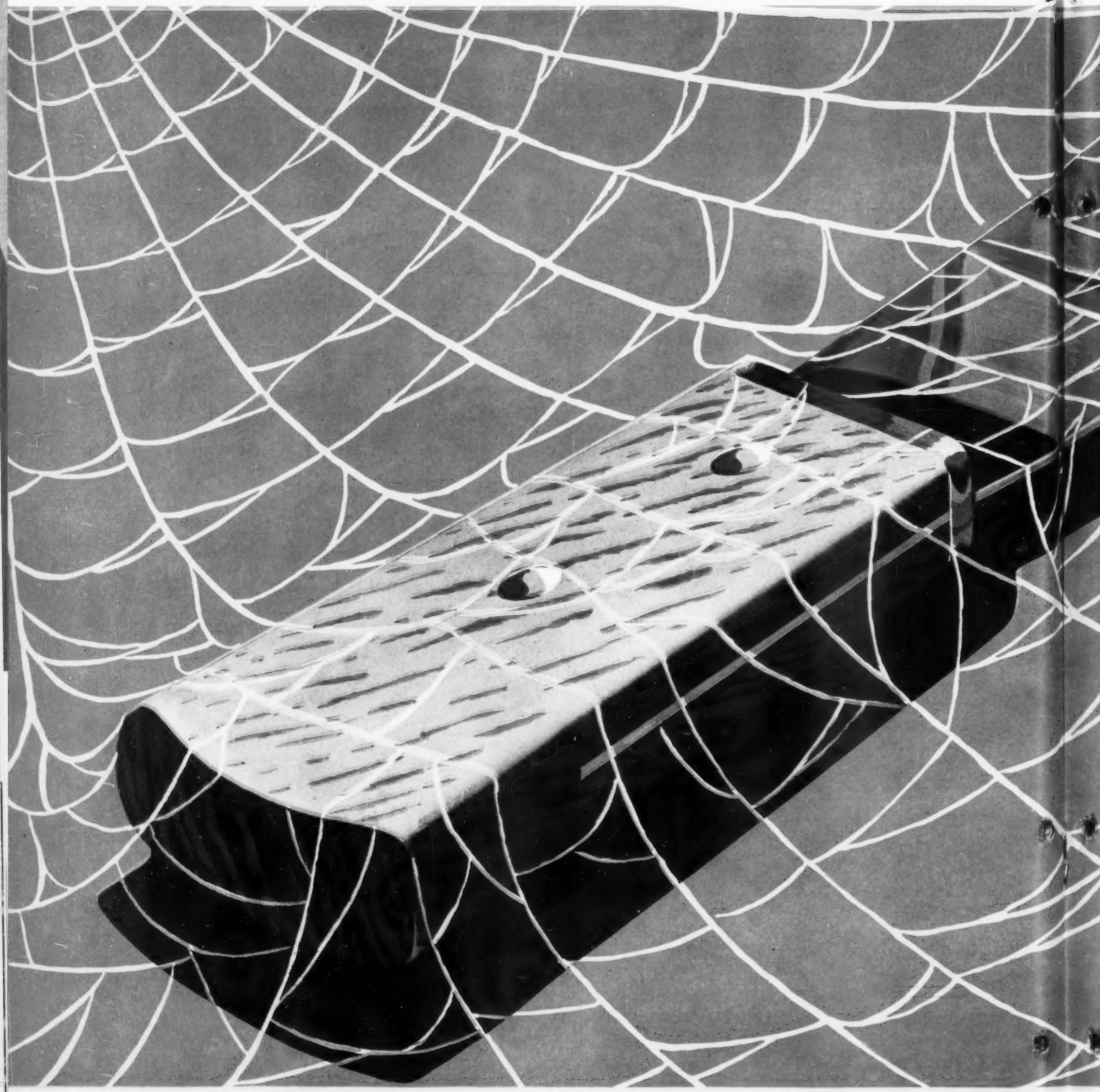
Crane valves are used whenever feasible in the constructions. It might also be added that The Fulton Sylphon overspeed control is used on all three engines and all three engines are equipped with Woodward isochronous governors.

At present 1,000 miles of line are energized in four counties, and construction on an additional 1,000 miles has started and is expected to be completed by early winter. This rural electrification project is a distinct credit to the R.E.A. Administration in Washington and to the Consulting Engineers, Young & Stanley.

The Pocahontas pump room which typifies extensive use of Crane valves and fittings in this successful R.E.A. project.



"WE SCRAPPED THI



TIDE WATER

THERE IS A COMPLETE LINE OF TYCOL LUBRICANTS SO

...CARBON SCRAPER"

Removing deposits from inside the Diesels used to be a costly job for this concern. The carbon deposits were so great as to be considered dangerous. But these conditions have become worries of the past – this operator changed to Tide Water Diesel Oil. » » » Now he runs the Diesels for a year and finds he can run them much longer. Deposits are insignificant; the "carbon scraper" has been thrown away. This operator knows what it means to use Tide Water Edeleanu-refined Diesel Oil. Harmful residues that tend to oxidize in service have been removed. The oils are of unusual stability. They assure the maximum performance per gallon of lubricant. » » » Be certain of results. Call in a Tide Water representative. Have him help you to select the right lubricant for your job. Learn what he can do for you with "lubrication engineered to fit the job."

TIDE WATER ASSOCIATED OIL COMPANY
TIDE WATER DIVISION
17 Battery Place, New York, N. Y.

INDUSTRIAL TYCOL OILS-GREASES

...DIESEL OIL

...NTS SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

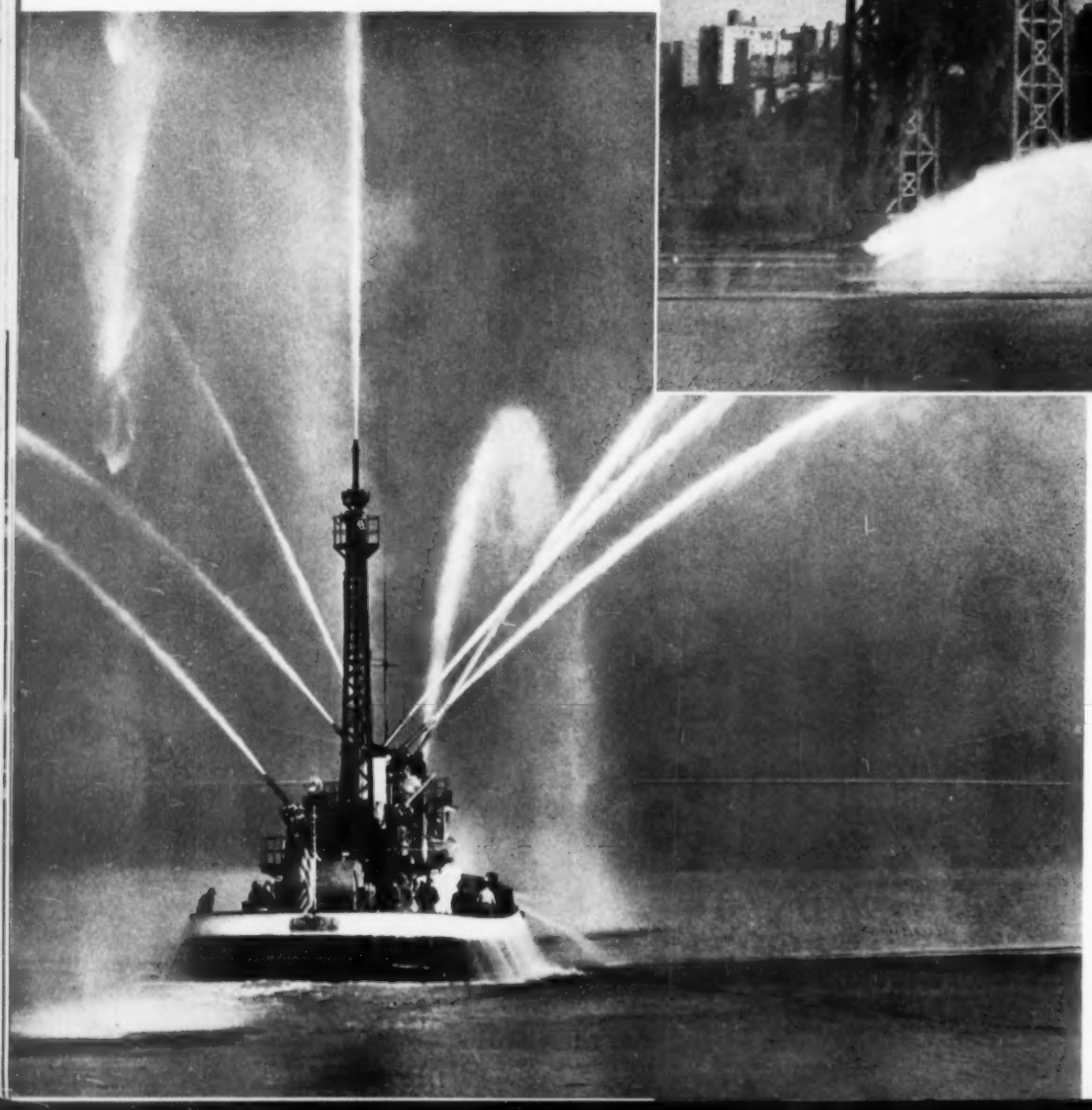
"FIRE FIGHTER"—DIESEL ELECTRIC FIRE BOAT

By GEORGE D. CROSSLEY

ENOUGH water to supply the normal needs of 223,098 American citizens can be pumped by the new *Fire Fighter*, the world's most powerful fire boat, which has just completed her trials and is now in service in New York harbor.

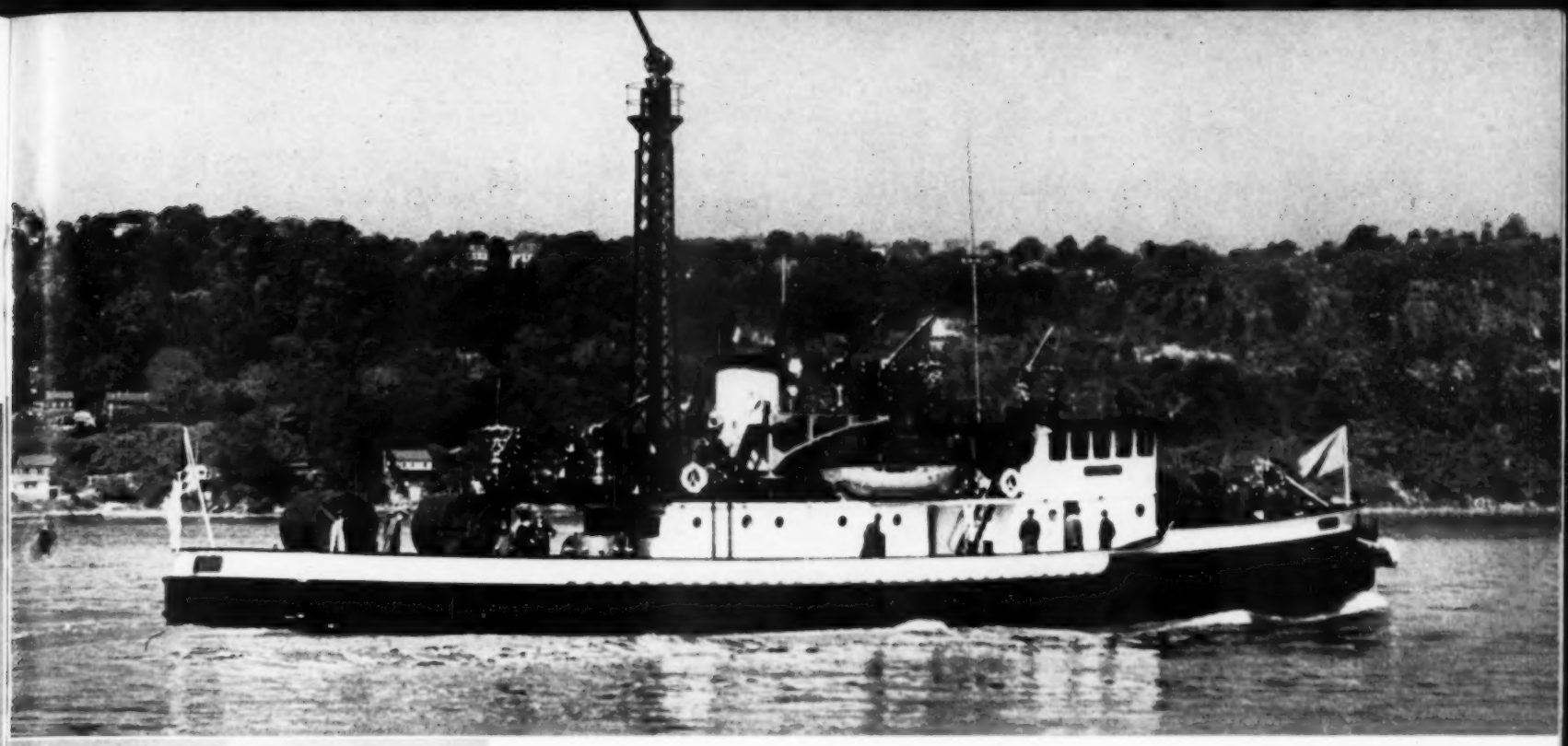
The Diesel-electric *Fire Fighter* has demonstrated on her tests that, without calling upon her full capacity, she can throw 22,000 gallons of water per minute. If this were kept up for twenty-four hours the boat would hurl 31,680,000 gallons of water. The enormous power of the fire boat is further demonstrated by the fact that when this huge volume of water was being hurled, some of it as far as 750 ft., the pressure at the nozzles was 150 pounds to the square inch.

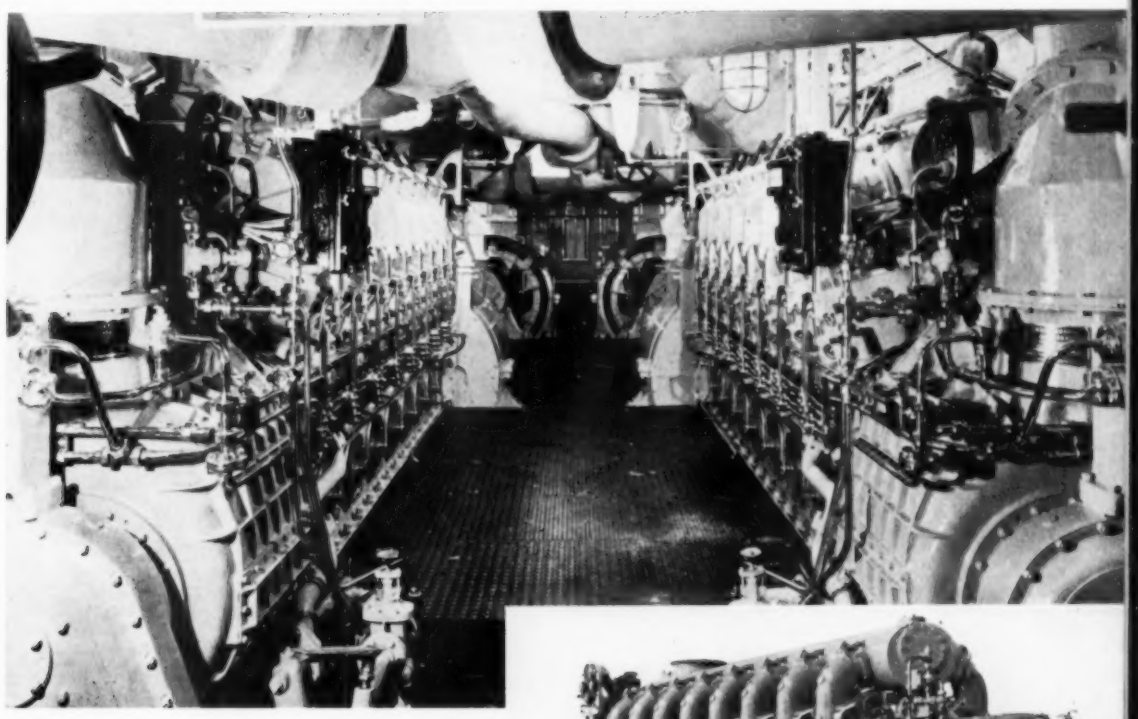
The power for this amazing new piece of fire fighting apparatus, which is expected to be of tremendous value in fighting conflagrations in the world's largest harbor, comes from two 1,500 hp., 16 cylinder V-type General Motors Diesel engines especially designed and built for this service at the Cleveland Diesel Engine Division of General Motors Corporation.

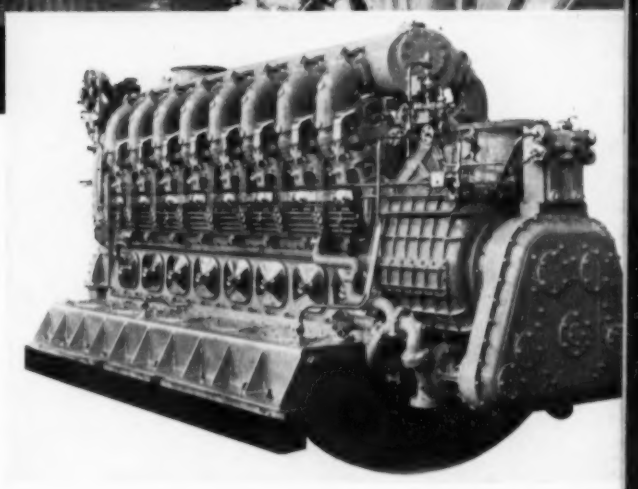


The most powerful previous fire boat in the world is the *John J. Harvey*, also of the New York Fire Department, which is rated at 16,000 gallons per minute.

The *Fire Fighter* was constructed in the United Shipyards on Staten Island, a unit of the Bethlehem Shipbuilding Corp. The architects were Gibbs & Cox, Inc. The contract was let for







The shop view of one of the 16-cylinder, 8½" x 10½", 1,500 hp. General Motors Diesel engines installed in the "Fire Fighter."

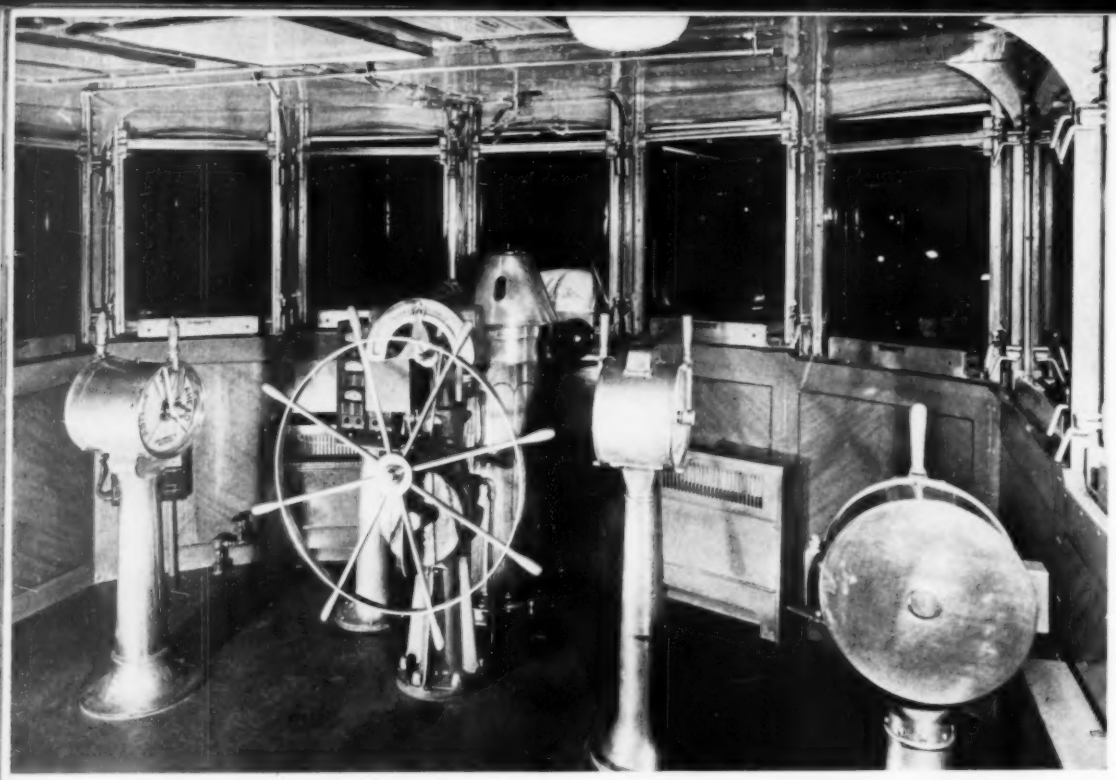
$924,000. The principal characteristics of the new fire boat are:

Length, overall	134 ft. 0 in.
Length, water line	131 ft. 0 in.
Beam	32 ft. 0 in.
Depth	13 ft. 3 in.
Sheer	3 ft. 6 in.
Draft	9 ft. 3 in.
Displacement	583 tons
Power for propulsion	3,000 hp.
Speed	17.02 mph.
Pumping capacity	20,000 gpm.

The electric propulsion and fire pump motor equipment was all furnished by the Westinghouse Electric & Mfg. Company and consists of two 1,000 hp., 425 rpm. propelling motors, two generating units, each consisting of the following generators mounted on a common shaft and supported by two pedestal bearings:

One 900 kw., 600 volt D.C., 750 rpm. generator for furnishing power for propulsion while going to a fire, and power for the fire pump motors while vessel is at the fire.

One 170 kw., 360 volt D.C., 750 rpm. generator for furnishing power to the propelling motors while the vessel is at the fire, and also power for the air compressor which may be



used at fires for pneumatic tools for cutting through concrete floors of piers.

One 40 kw., 120 volt exciter and auxiliary power generator.

There are four Westinghouse 600 hp., 1,500 rpm. fire pump motors, one 40 kw. auxiliary G-M Diesel driven engine generator, one 10 kw. auxiliary G-M Diesel driven generator and a 10 kw. motor generator set plus, of course, the usual engine room switchboards for propulsion, fire pump circuits and auxiliary power circuits.

The *Fire Fighter* has a number of very distinctive feaures. It is the first fire boat in New York Harbor to use Diesel-electric drive. It is the first New York City fire boat to use electric motor driven fire pumps, thus permitting the installation of pumping greater than in any fire boat in the world. Furthermore, it is the first fire boat in New York City to have pilot house control of the propelling equipment and the first to have remote control of the engine speed. And it is the first fire boat to have a fire tower which can be raised and lowered through hydraulic control and the first to have remote electric control of the large nozzle at the top of the fire tower. On the *Fire Fighter* this nozzle can be controlled from the deck both in elevation and rotation.

The electric transmission of power provides the greatest flexibility in the application of power and the duplication of all elements vital tc the generating or use of power enables the vessel to perform all normal functions of fire fighting, even though only half of the equipment is used. Electric drive greatly increases the speed and facility of maneuvering. The trials of the *Fire Fighter* showed that it could get under way with surprising rapidity, getting up to full speed in a few boat lengths. This is due to a large reserve of power in the Diesel engines and electrical equipment, a factor which promotes safe operation as the vessel can be stopped with equal celerity.

Fire Chief and Commissioner John J. McElligott in his brief speech at the launching brought out some other interesting features:

"The engine room can be absolutely sealed up during a smoky fire, and the air therein reconditioned every two minutes.

"She is provided with two-way radio telephone communication.

"The fire tower is of collapsible design, which, when not in use lies aft in a horizontal position. It can be raised by hydraulic power to a height of 55 ft. above the water line in half a minute. It is equipped with a 3,000 gallon per minute nozzle, which is operated and controlled by electric motors from the deck of the boat.

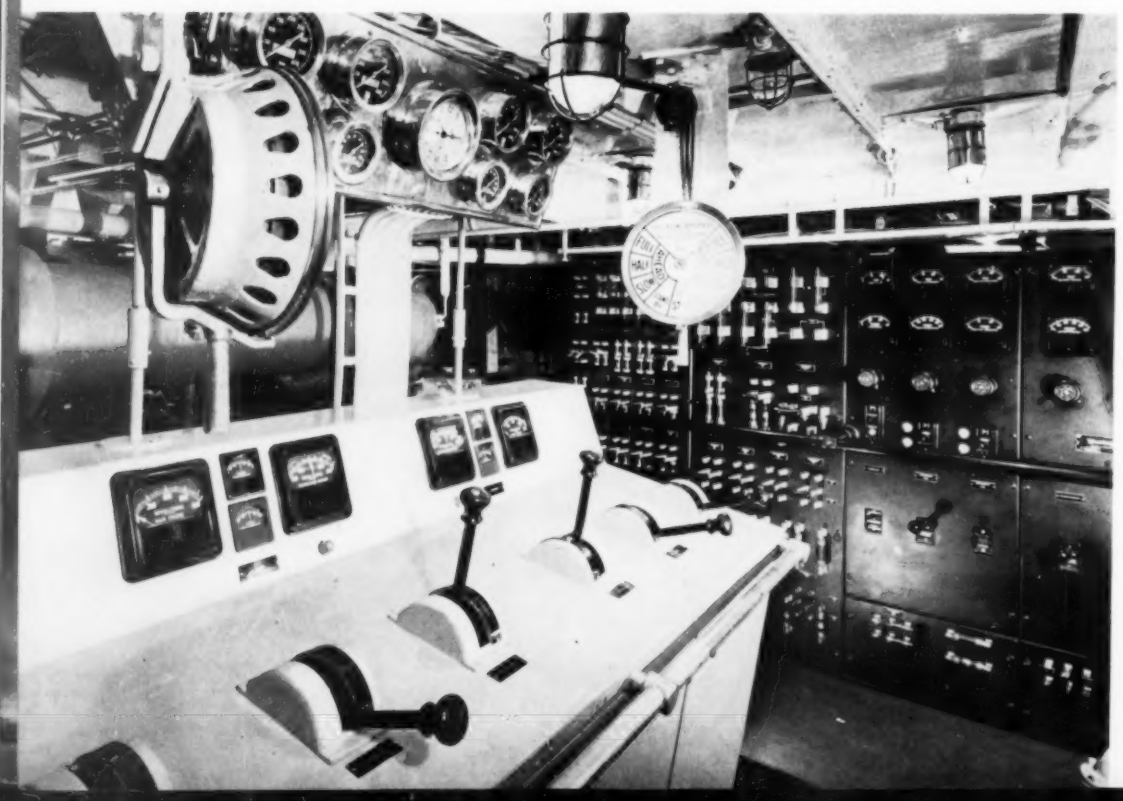
"There is a 5 in. nozzle on the bow-gun which will discharge 6,500 gallons, or 27 tons, of water per minute, at 150 pounds pressure. The pressure exerted by the discharge from this nozzle will be sufficient to carry away an ordinary wooden building or tear through and destroy a substantial brick wall.

"The installation of an air compressor capable of operating four pavement breakers, will enable our firemen to cut holes through the floors of concrete piers.

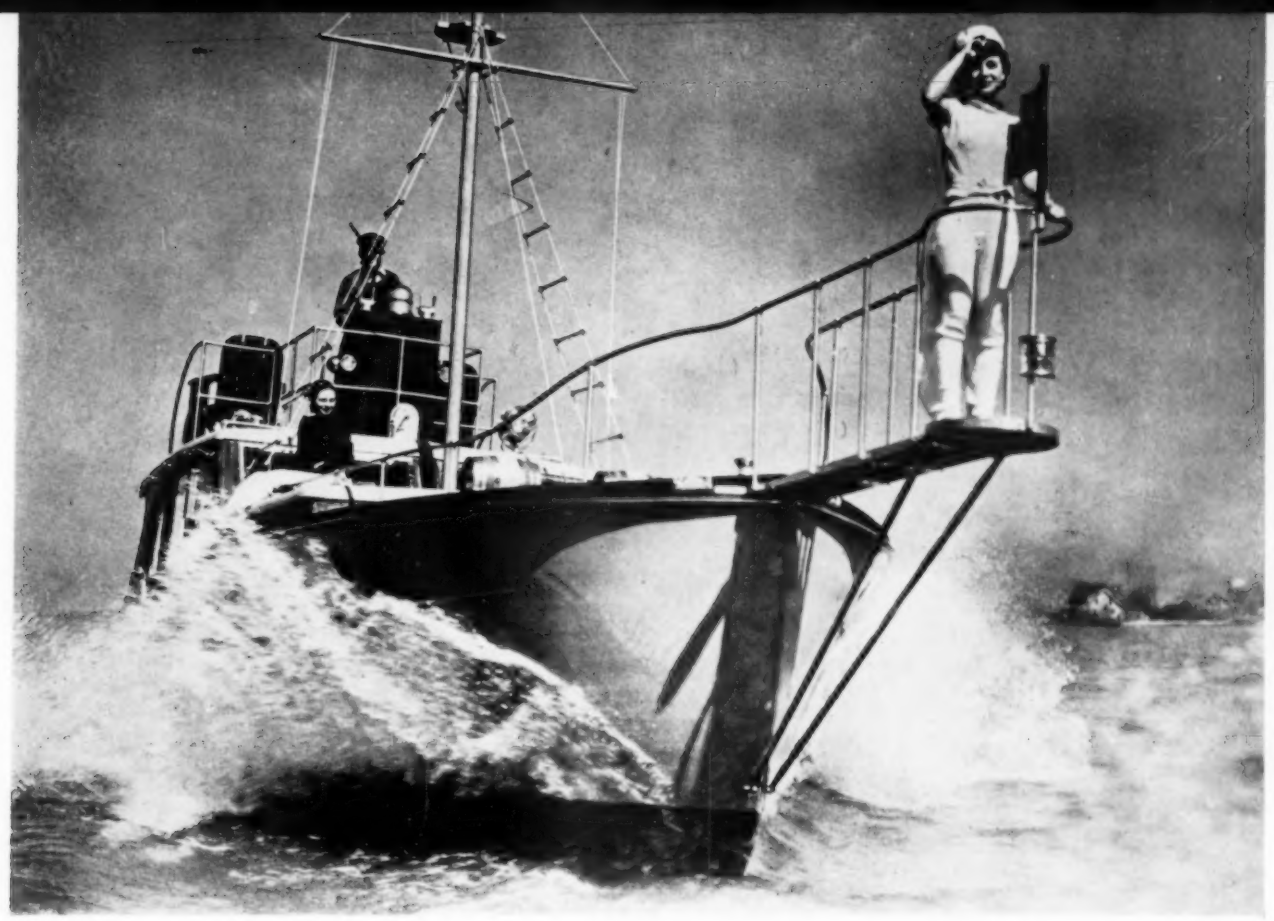
"The exterior of the hull and superstructure is equipped with perforated pipes which can be used to surround the entire vessel with a curtain of water should it be operating under severe heat conditions.

"The electric power plant of this vessel is sufficient to supply the electrical requirements of a building such as the Empire State Building, or the supply of all of the electrical needs of a city of 12,000 population. The main searchlight is of 1,500,000 candle power."

And so the *Fire Fighter* goes into service – the last word in the application of the modern, high speed type of Diesel engine to heavy duty marine service.



Engine room control desk for control of propelling motors and fire pumps providing speed control of the main G.-M. Diesel engines from 360 to 750 rpm.



SARAH-ELLEN II

By GEORGE D. CROSSLEY

JACK W. SIMMONS of Tallahassee, Fla., has always been a fisherman at heart. As a boy, he viewed the fishing craft being tossed about by storms and vowed that some day he would own a complete and comfortable sport fishing boat that would eliminate the hardships of fishermen and make it possible to follow the fish with safety in any water in the world. Today he has realized that ambition in a trim new Chris-Craft, *Sarah-Ellen II*, comparable in every detail to the largest luxury liner of the Atlantic. Every known convenience is incorporated on *Sarah-Ellen II* to add to the enjoyment of guests, lessen the labors of navigation and eliminate the hardships to the crew.

The skipper or owner need no longer spend weary hours on the bridge. Instead he becomes an executive officer, able to fish and partake in all shipboard activities. At his command is an automatic steering device, or robot pilot, designed to keep the boat on a definite course without the touch of human hands, until a change of direction is desired. This mechanism rivals that of the newest and most complete luxury liner. It compensates for tides, wind and similar geographic conditions.

Provisions are also made for changing to a remote control which enables the skipper to steer from the harpoon pulpit, crow's nest, engine room, or any other part of the ship. Should one be touched with remorse at the modern methods of navigation, and long for the old salt water days of the "ship's wheel and lubber mark," the change to standard manual controls may be made by merely pushing a button.

The master set of controls is on the port side of the aft bulkhead. A duplicate station is located on the cabin top for "round horizon vision." The latter is used when a fish is hooked, as from this point the pilot is able to watch the fun and aid the angler by maneuvering the boat to match the skill and speed of the most elusive quarry. *Sarah-Ellen II* is equipped for catching and landing almost any denizen of the briny deep, as her fishing equipment includes a harpoon pulpit, mast and crow's nest, 46 ft. outriggers, swivel type fishing chairs, bait boxes with electric refrigeration coils, kegs for marking harpooned fish, and even a collapsible transom to assist in bringing aboard those "big ones." In fact, every available inch of space is used for fishing purposes.

In addition to being the most complete boat in the world, the *Sarah-Ellen II* rivals pleasure yachts in luxurious appointments. Unusual features found on this new craft include a shower bath with hot and cold running water, electric toilets, lounges with comfortable box springs, radios and a ship-to-shore telephone. The latter is believed to be an entirely new development for pleasure fishing craft and is so simple that even an amateur may become an expert operator in a few minutes. One may call Coast Guard vessels, the shore station, or any ship equipped with a similar transmitting and receiving set. A conversation may be carried on with the same ease from a home or office. As a result of this development, it is possible to fish hundreds of miles off the coast and still be in constant touch with business.

A veritable home afloat, the new boat has its own complete electric generating plant, rectifier and refrigerator – even the anchor hoist is electrically operated. The *Sarah-Ellen II* has a cruising radius of several hundred miles and hails from St. Marks on the west coast of Florida. Mr. Simmons, president of the Elberta Crate and Box Company, of Tallahassee, has planned his first cruise, a mere jaunt of 1,500 miles from Algonac, Mich., to Florida waters. Future plans call for fishing off the Bahamas, and the Gulf of Mexico. Yes, a boyhood dream has been realized – in the modern manner.

The *Sarah-Ellen II* is powered with two Kermath-Hercules Diesel engines model 6-288. The engines are of 3¼ in. bore and 4½ in. stroke, hence of a displacement of 298 cu. in., and develop 84 hp. each.

DIESEL LIGHTS SCENIC CAVE

By GEORGE D. CROSSLEY

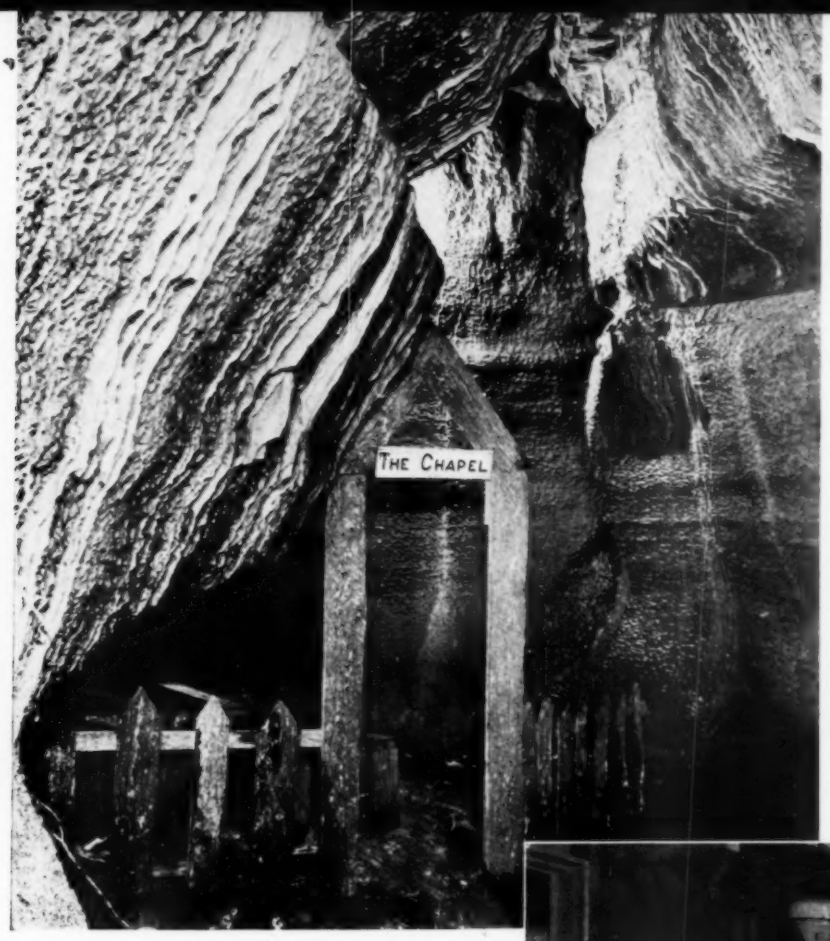
ON a hilly farm near the Iowa-Minnesota State Line, three little pigs wandered out into a field. They were not on their way to market or anywhere else in particular, but their sudden disappearance from the face of the earth would have baffled the great Sherlock himself. They vanished, but their loss brought to light a site of natural beauty having few rivals on this earth.

The episode of the three little pigs occurred early in 1934. The owners, who had been harassed by the strange disappearances of livestock before, determined to find out the cause. They did, and discovered a narrow opening in the ground. When a rock was dropped, a considerable length of time ensued before the splash was heard.

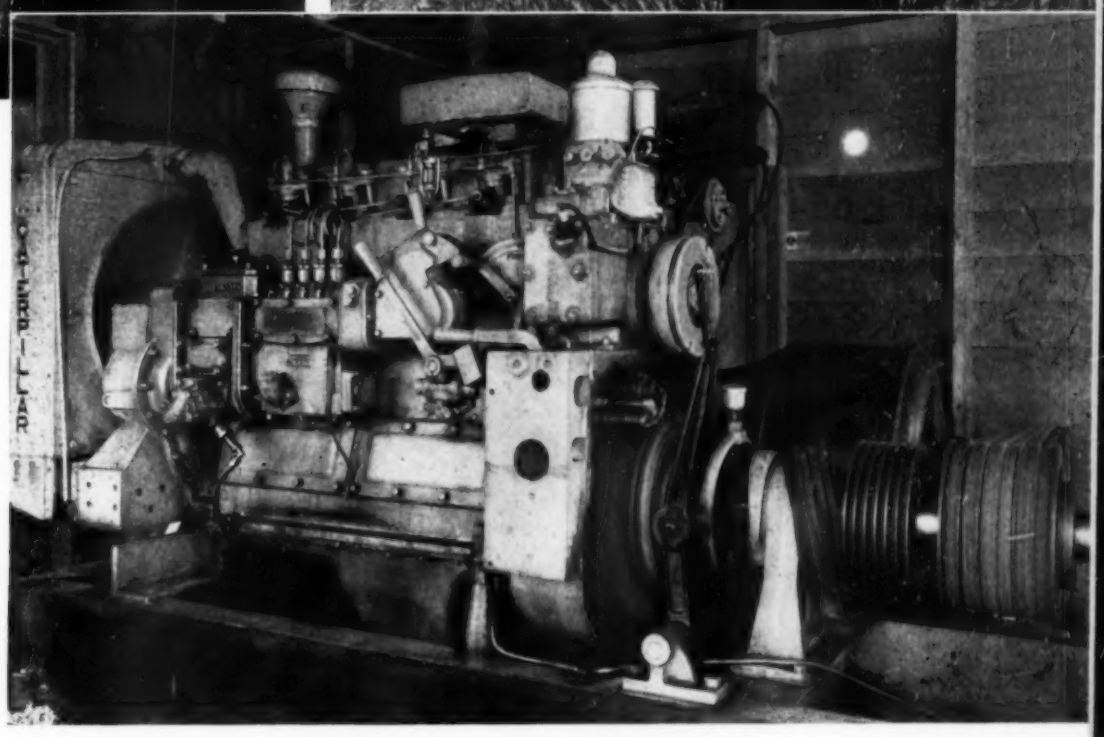
The three owners, Al Cremer, Joe Flynn and Leo TeKippe, decided to explore the mysterious cave. They outfitted themselves with food, flashlights and ropes. Down through the narrow crevice they descended into the darkness. Below, the trio found massive rooms with high ceilings, gorgeous stalactites, roaring streams, age-old fossils, delicate formations and dazzling crystals. They found a new world.

In June, 1934, these three men opened this Hidden Paradise to the public. Steps were cut and stairways built to make it easy for visitors to explore the wonders of a 60-foot waterfall, the Wishing Well, the Crystal Wedding Chapel (where weddings are actually performed), Flirtation Walk and the glittering Stalactite Room.

This new tourist mecca which last year drew approximately a hundred thousand visitors from every State in the United States, from Mexico, Canada and Europe, has been named "Niagara Cave." In preparing this scenic wonder for the public, one of the principal problems was adequate lighting, according to Mr. Cremer, who is vice-president of the organization. In the first year the cave was opened to the public, a gasoline engine supplied the current for lighting, but at the close of the year, costs were found to be 4c per kilowatt which was declared by the management to be excessive. After considerable investigation, the lowest cost power that had been discovered was around 3c per kilowatt, which would have meant a power cost of around $1,200 for a half year's operation. Sponsors of Niagara Cave were not satisfied with this estimate and it was then that Diesel power was suggested to them. As a result, a D4400 "Caterpillar" Diesel engine was installed on June 15, 1936, and was belted to a 15 kilowatt D.C. generator. Since that time it has ope-



Two underground views of the Niagara Cave give the reader an indication of the natural beauty and grotesque rock formations recently discovered underground near the Iowa-Minnesota state line.



Just to prove that Diesels are now being used practically everywhere, here is the 15 kw. Caterpillar generating set operating in the cave 16 hours a day 7 days a week supplying electric light for less than one cent per kilowatt hour.

rated at the rate of 16 hours a day, 7 days a week, delivering 14 kilowatts each hour, or a total of 224 kilowatt-hours a day.

Average fuel consumption per day has been only 25 gallons of fuel oil costing 7½c per gallon, plus 25c a day for lubrication expense, making the total operating cost only $2.12 or an average operating cost of .9c per kilowatt hour.

The operating cost for six months was $362.88. For the purpose of retiring the initial purchase price, depreciation was set at $300 for the period, making the entire cost $662.88. Based upon the output of 40-320 kw. hrs. for the period, the average total cost was given as 1.6c per kw. hr. Comparing this expense with the figures given them on other types of power, the proprietors estimate their savings for six months to be $546.72.

It is declared to be well worth the while of every traveler across the Middle West to plan his itinerary so that it will include a visit to the now-famous Niagara Cave. It is located two miles south and two miles west of Harmony, Minnesota, or twenty-five miles north of Decorah, Iowa, and fifteen miles north of Cresco, Iowa. It is forty-five miles south of Rochester, Minnesota, on U. S. Highway 52. Roads to the cave are in excellent condition, winter and summer.

Thus has Diesel power, bringing its blessings deep into the earth's crevices, added another conquest to its long record. The lighting that is so generously distributed through the caverns develops those subterranean vistas so thousands of visitors may see them at their best.

The new Dornier "Do 26" flying boat built for Deutsche Lufthansa will fly non-stop between New York and Lisbon in 18 hours. It is powered with four 600 hp. Junkers Jumo "205-C" Diesels.

NEW FOUR-ENGINED DIESEL FLYING BOAT FOR TRANSATLANTIC AIR SERVICE

By PAUL H. WILKINSON

THE new Dornier *Do 26* flying boat which completed its trials last month, is destined to set a new standard for long-distance airline operation. Powered with four 600 hp. Junkers Jumo *205-C* Diesels, it will be able to take off from the water with a payload of from 2,000 to 2,500 lb. and fly a distance of 3,500 miles with this load at a cruising speed of over 190 mph. Deutsche Lufthansa will be able to operate these planes between New York and Lisbon, covering the distance *non-stop* in about 18 hours under average flying conditions. Although weather conditions on this direct route between the United States and Europe are quite favorable, regular operation of aircraft powered with gasoline engines over it would be extremely difficult, particularly if any payload were to be carried.

One of the outstanding features of the *Do 26*, is the engine arrangement. The Diesels are mounted in tandem, as on the smaller twin-engined *Do 18*, the rear engines being equipped with extension propeller shafts. This creates beautifully streamlined engine nacelles and at the same time, it enables the rear engines and their propeller shafts to be tilted upward to an angle of 10 degrees above the horizontal while the airplane is taking off from the water. It keeps the propellers away from the spray, and when the airplane is in the air, the engines and their propeller shafts are lowered to their normal "straight-line" position.

The hull of this new all-metal plane is divided by bulkheads into eight watertight compartments. The wing is in three parts, with the dihedral center section supporting the two slender engine nacelles. The wing tip floats are of narrow rectangular section, and are completely retracted into the lower surface of the wing during flight. Part of the hull itself, constitutes the fuel tank and this saves weight and space.

In the bow compartment, is carried the usual marine equipment, and behind this comes a room for mail and cargo. Next comes the comfortable pilots' cabin, communicating with the radio and navigation station, and with the control station for the engine controls and instruments under the supervision of the flight engineer. Further aft, are a tank room, another mail room, and a well-appointed lounge and gallery. When equipped as a mail plane, the *Do 26* carries a crew of four or five so that no undue stress is placed upon the operating personnel. As a passenger plane, there would be room for about eight passengers and their baggage in reclining chairs, with buffet service.

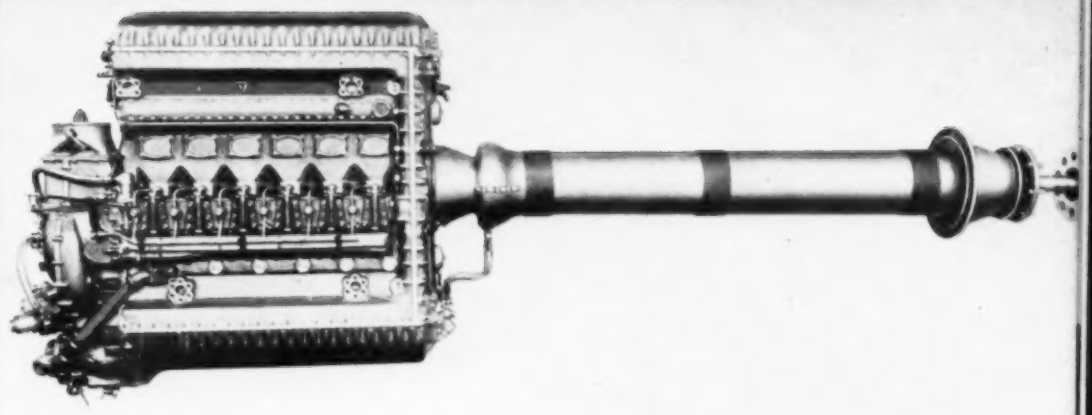
The Dornier *Do 26* has a span of 98 ft., a length of 80 ft., and a wing area of 1,292 sq. ft. The maximum speed of the plane, is 208 mph., and it has a flying range up to 5,600 miles carrying 80,000 airmail letters (equivalent to 2,500 lb. at a weight of one-half ounce each), or a corresponding weight of cargo. The normal power loading of the plane is 16.8 lb. per hp., and the wing loading is 31.3 lb. per sq. ft.

The accompanying tabulation shows, among other things, what would happen if four air-cooled radial gasoline engines of equal power were used on the *Do 26*. It will be noted that for a non-stop flight from New York to Lisbon, an additional weight of 6,268 lb. of fuel would have to be carried by the gasoline-engined plane. This would eliminate all possibility of payload being carried, and would result in the plane having to take off in a considerably over-

loaded condition. The reduced cruising speed and longer time required for the crossing of the gasoline-engined plane, are due to the greater head resistance and drag caused by its four radial engines of 57.6 sq. ft., compared with 35 sq. ft. for the neatly streamlined in-line Diesels. The saving of $197.43 (or 72 per cent) in fuel cost for the Diesel, is also an item that should not be overlooked.

Deutsche Lufthansa completed their 28 scheduled flights across the North Atlantic this summer without mishap of any consequence. They could have transported at least 20 tons of airmail during these flights, had not this been blocked by certain interests at Washington. Despite these obvious facts, we read in the *New York Sun* of October 2: "The season is getting so late there probably will be no scheduled flying across the Atlnatic until next spring." This conveniently overlooked the fine achievement of Deutsche Lufthansa and its Diesel-engined aircraft in a hasty effort to give the impression that nobody except the United States is capable of flying the North Atlantic on regular schedule.

Again, in the same newspaper and on the same date, we read the amazing statement: "Pan American Airways has been ready all summer to inaugurate (transatlantic) service, but has been kept out of the air by a reciprocal agreement with the British." Why blame it on the British? At least, let's be honest about the matter and admit our own shortcomings. At the time this appeared in print, the first of the Boeing *314* Clippers which might have been



The Junkers remote propeller drive is used on Dornier "Do 18" and "Do 26" flying boats with great success.

used, had just had its tail surfaces rebuilt and was only then undergoing its preliminary flight tests at Seattle. It had not passed its Department of Commerce tests, nor had it or its engines been flown any appreciable distance.

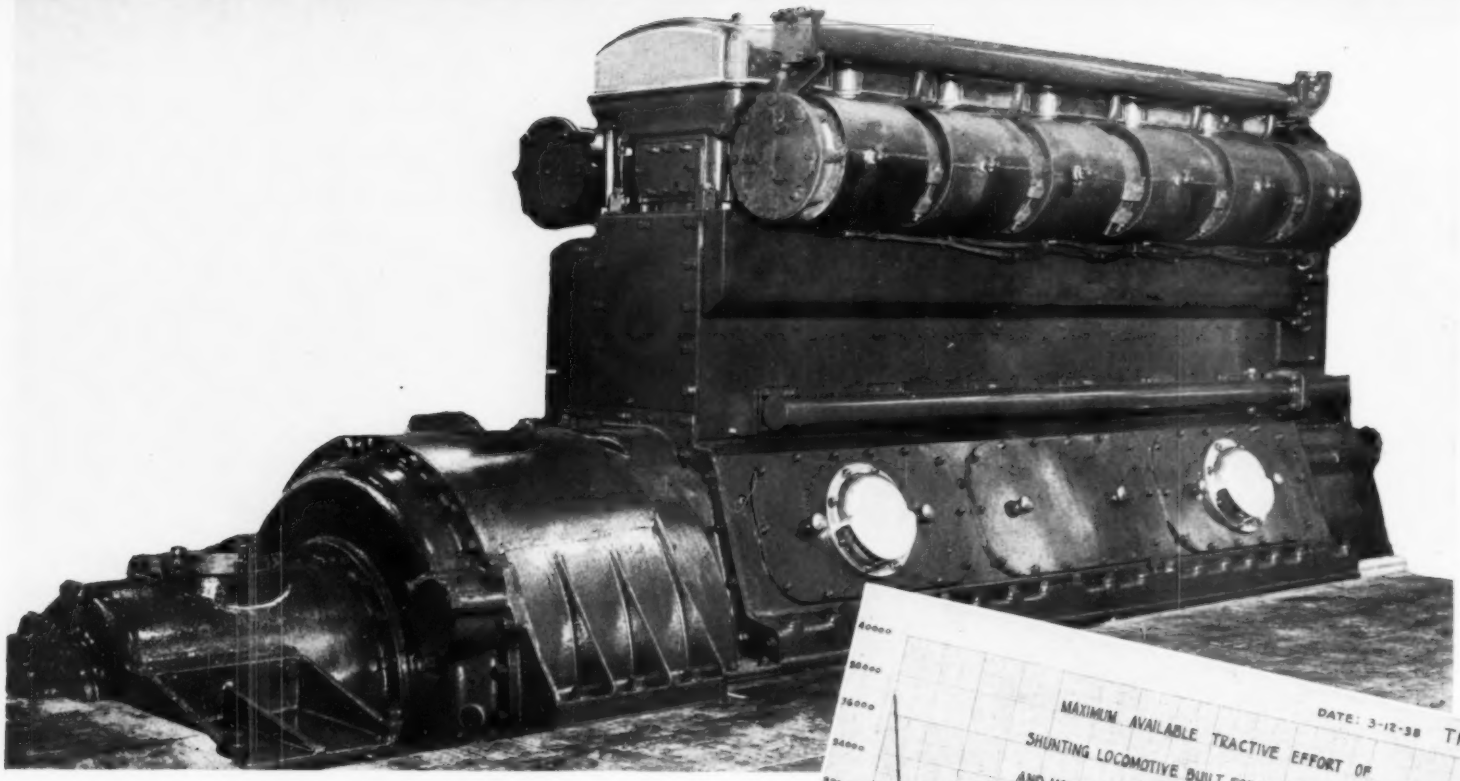
The *New York Times* gave the right slant on the situation in its article of October 10, in which Pan American Airways stated: "Since the Hawaiian Clipper's disappearance on July 28, losses (on the trans-Pacific service) have run about $95,000 a month. As a result of losing those planes (Hawaiian Clipper and Samoan Clipper valued at about $200,000 each), the company now has enough equipment to fly only 60 per cent of its (trans-Pacific) schedule."

COMPARISON OF DORNIER *DO 26* FLYING BOAT WITH GASOLINE AND WITH DIESEL ENGINES ON NON-STOP FLIGHT BETWEEN NEW YORK AND LISBON

Type of engines used	*Gasoline*	*Diesel*
Distance (miles)	3,500	3,500
Cruising speed (mph.)	180	193
Duration (hours)	19.4	18.1
Duration + 25% reserve (hours)	24.2	22.6
Power output of engines (hp.)	4 x 600	4 x 600
Cruising output at 75% (hp.)	1,800	1,800
Fuel consumption (lb./hp./hr.)	0.46	0.34
Fuel for 24.2 and 22.6 hours (lb.)	20,038	13,770
Empty weight of plane (lb.)	20,579	22,487
Useful load less payload (lb.)	21,764	15,203
Payload (lb.)	0	2,000
Gross weight of plane (lb.)	*42,343	39,690
Fuel for 19.4 and 18.1 hours (gal.)	2,677	1,547
Cost of fuel per gallon	$ 0.11	$ 0.05
Total cost of fuel consumed	$294.47	$77.35

*Represents *overload* of 2,653 lb. compared with Diesel-engined plane.

Close up of the Dornier "Do 26" showing how one of the rear engines is tilted up at an angle of 10 degrees for take-off from the water. One of the retractable wing-tip floats is also shown.



The new 6-cylinder Hamilton M.A.N. Diesel engine 8¾" x 12", rated at 400 hp. at 900 rpm.

A NEW HAMILTON M.A.N. DIESEL AND A NEW HYDRAULIC TRANSMISSION

By REX W. WADMAN

THE Hooven, Owens, Rentschler Division of General Machinery Corporation, Hamilton, Ohio, recently announced a Diesel hydraulic power unit for locomotive drives in connection with their new line of 4 cycle, 8¾" x 12", Hamilton M.A.N. Diesel engines.

One of these 400 hp. 6-cylinder engines, rated at 900 rpm., is now being installed in a large industrial locomotive by the Plymouth Locomotive Works. This will be the first unit installation of the Hamilton M.A.N. 4-cycle engine with the Schneider hydraulic transmission.

The hydraulic transmission attached to the driving end of the Diesel engine delivers the power of the Diesel at any speed desired, to the driven shaft, from stalling to maximum speed. It consists of a combination of turbine drive and two-speed gear box, the turbine drive presenting a most efficient torque converter which delivers the horsepower over a wide range of speed, and torque by means of two ranges of the gear box to the driven shaft.

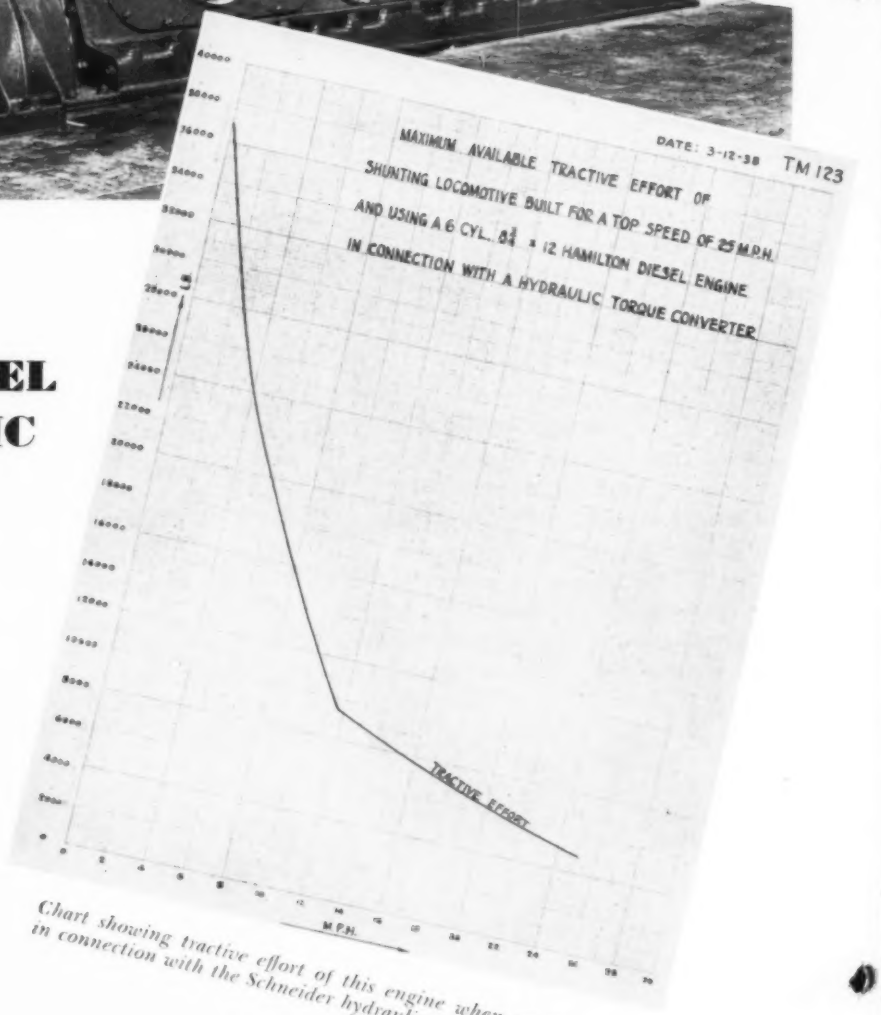
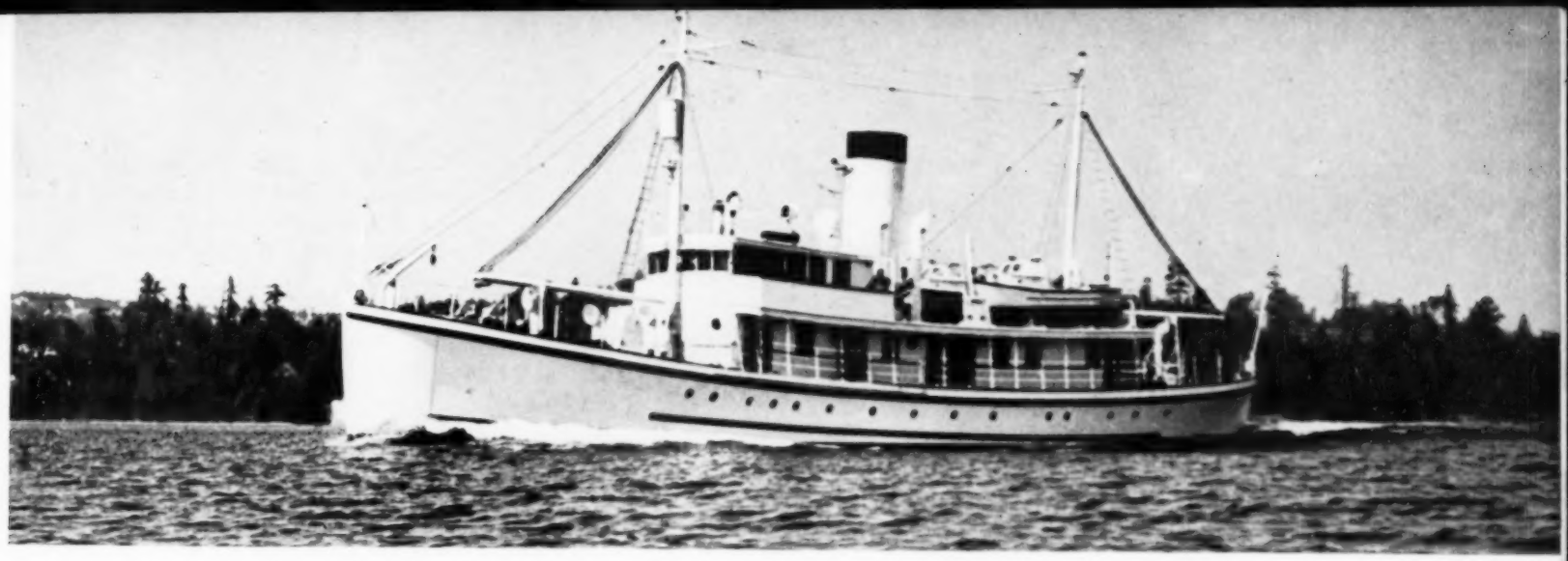

DATE: 3-12-38 TM 123
MAXIMUM AVAILABLE TRACTIVE EFFORT OF
SHUNTING LOCOMOTIVE BUILT FOR A TOP SPEED OF 25 M.P.H.
AND USING A 6 CYL. 8¾ x 12 HAMILTON DIESEL ENGINE
IN CONNECTION WITH A HYDRAULIC TORQUE CONVERTER
TRACTIVE EFFORT
M.P.H.

Chart showing tractive effort of this engine when used in connection with the Schneider hydraulic transmission.

This hydraulic transmission is the final, highly developed product of twenty years of experience and development of the Schneider brothers, who have designed and built many different kinds of hydraulic torque converters, and combinations of hydraulic and mechanical drives.

The outside view of the Diesel engine and transmission shows the simplicity of the whole unit. The torque converter is completely automatic and, therefore, no mechanical operating mechanisms can be seen on the transmission. A hand lever on the operating stand controls the speed of the Diesel engine, while another lever controls a valve by which one or the other gear set of the transmission is hydraulically engaged or disengaged.

More complete details of the Schneider hydraulic transmission will appear in a later issue of DIESEL PROGRESS.



A new 135 footer powered with a pair of 400 hp. Washington Diesels for Captain F. E. Lewis.

A NEW "STRANGER" FOR CAPTAIN LEWIS

By CHARLES F. A. MANN

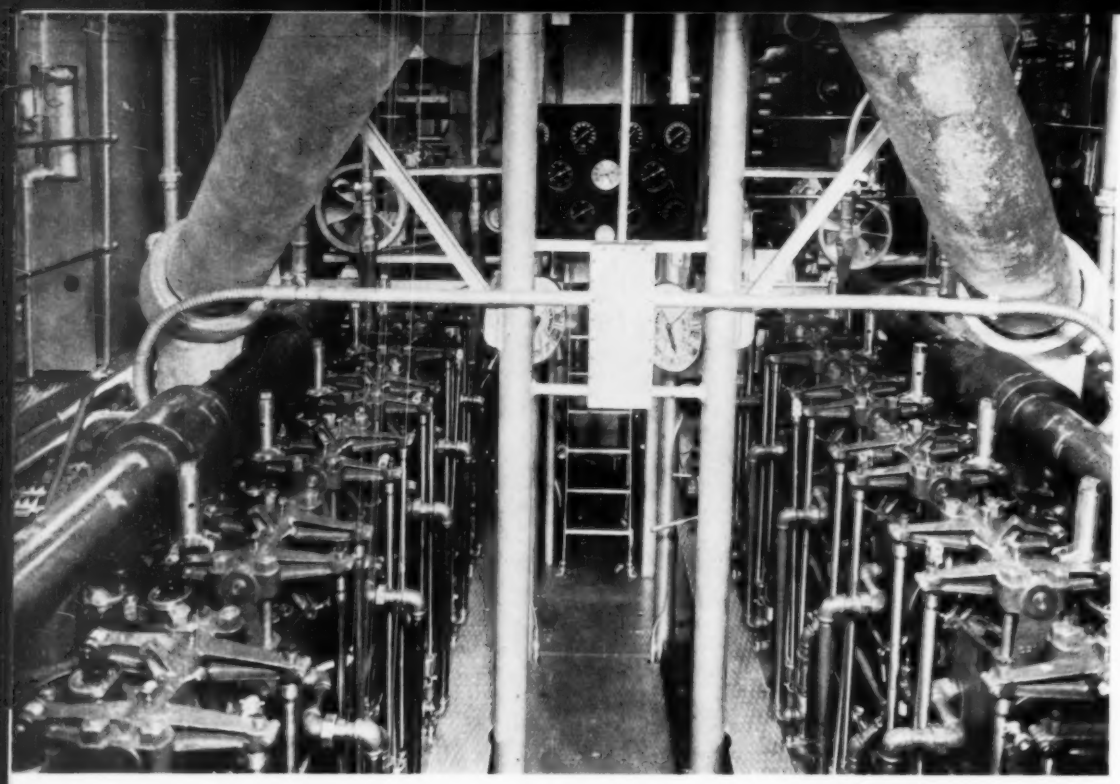
SEATTLE yachtsmen and waterfronters have watched with keen interest and unusual curiosity the construction of a large, white, Coast-Guard type of vessel at the busy plant of the Lake Union Drydock and Machine Works all summer long.

Occasionally a little trucklet with enclosed sides would whizz down the fitting-out dock and out would pop two distinguished figures in Pacific Coast yachting and marine affairs, L. E. "Ted" Geary of Los Angeles, foremost Pacific Coast yacht designer, and Capt. F. E. Lewis, of Diamond Bar Ranch and Balboa Cal., Honolulu, the South Seas, and way ports.

Popping up the gangplank of this unusual vessel, these two gentlemen were rushing to check one more piece of equipment or fitting and to supervise its careful installation aboard this vessel, known as the *Stranger,* eighth in the long line of Lewis-owned private ships all of the same name. No other vessel built on the Pacific has been so elaborately equipped mechanically, nor has had such careful and constant supervision in its construction as the *Stranger.* The Lake Union yards, in charge of an Easterner, like Capt. Lewis, has turned out a vessel that will undoubtedly outlast any wooden vessel built in modern times, and one that is likely to help to continue the colorful career of its owner as long as he may wish to roam the world in search of knowledge and adventure and, at the same time, offer the simplest of homes afloat for the most enthusiastic ocean voyager in the U. S. A.

Well, you say, why not stop the preliminaries and call it a yacht, and break the suspense! Well, dear reader, it isn't a yacht – Capt. Lewis will explode if you dare call it such, and, if you will study the plans you will agree it definitely is not a yacht, but a unique work-play-hobby ship built to the exacting demands of a man of simple tastes, a few unique hobbies and a strong love of the sea and all it contains. Below decks, you will find a single room, fitted as a photographic darkroom, that is the sole break in the general layout of the vessel. This is the workshop of Mrs. Lewis, charming wife of the Skipper, who intends to pursue her hobby as a photographer, artist and sculptor of parts, while afloat.

The *Stranger* represents the ultimate refinement in a special type vessel gathered from ownership of many kinds and sizes of yachts. Capt. Lewis at one time owned a 230 ft. steel Norwegian freighter converted to a yacht; a 163 ft. steam yacht; a converted 110 ft. Sub Chaser and has visited 400 ports on the Pacific. It is natural, therefore, that the newest *Stranger* should embody just about every practical mechanical improvement it is possible to put aboard a vessel. From the all wave code and telephone World Wide radio, the twin 22 ft. workboats mounted on the upper decks, down to the oversize storage battery and automatic electric water distillation plant, the equipment is designed to make living aboard for months at a time a pleasure. To be gone from civilization for months at a time, away from supplies, food and fuel bases, yet to be able to live in peace, comfort, safety and security while pursuing photography and the study and collection of deep sea marine life, was the object in mind when Mr. Geary designed the craft. To enable a small crew to make emergency repairs at sea, and to assure long life of hull with little costly routine maintenance, the hull and rudder were specified of wood instead of steel. To assure dependable dual-drive propulsion at medium speeds and on long straight runs, the heavy duty, 4 cycle, workboat type of Diesel machinery was fitted. The auxiliary machinery, requiring over 160 electric motors throughout the ship, was built in duplicate and arranged so that if one piece of machinery fails, another can quickly take its place. Living quarters for the crew were shifted from the forecastle to a place nearer the center, to give them more riding comfort in rough seas. A closed system of handling rainwater from the decks provides supplementary water supply in the tropics. Heavy electric davits permit handling either of the twin launches overboard, with ease, to go after those elusive specimens or to catch tropical fish. The living room looks like a



General engine room view of the "Stranger."

combination of a drawing room and college scientific laboratory, with bookcases, overstuffed furniture and Venetian blinds thrown in. The hull is probably the deepest one ever put under a ship its size, built on the Pacific Coast, except perhaps a lightship. By making the hull narrow, deep and heavy with a big lead keel shoe, a boat of remarkable stability and slow roll was achieved. A comfortable rest at night, in stormy weather, and a "Big Ship" ride on deck when the seas roll high, in daytime.

Dimensions – Length, 135 ft.; beam, 22 ft. 8 in.; depth, 13 ft. 5 in.; gross tons, 297; net tonnage, 202.

Hull construction above the waterline is yellow cypress and teak – below, Douglas fir, the kind that all good Western wooden vessels are made of. The frame is double sawed yellow cypress on 18 in. centers, varying in thickness from 4 to 6 in. Under the entire engine room the framing is solid. The hull is double planked, one horizontal and one diagonal, with a total thickness of 4½ in. The decking is of teak laid on cypress.

House sides and upper deck are of double planked red cedar laid on cypress studs, combs and carlines.

About as rot-proof as any wooden ship could be made. Special wood preservative treatment below the waterline and the use of special kinds of paint and enamels keep the interior firm and dry. Aluminum paint is used exclusively in the engine room and the engine room floor plates are of duraluminum. All brightwork is stainless steel.

The hull is very deep, but because of heavy topweights, a lead shoe 90 ft. long, weighing 15 tons, is carried on the keel to prevent rolling. It is 5 in. thick and 13½ in. wide. On all tests the *Stranger* showed a 14½ second roll. The craft is literally a big double-ender, with high freeboard and plenty of deck space. Centered in the hull, which is divided into five watertight compartments, is the large engine room, crammed on two levels with the elaborate main and auxiliary machinery. The machinery flat, or four-sided balcony, would do well on a small ocean liner. Main power is a pair of 8-cylinder, heavy duty, 4-cycle, trunk-piston Washington Diesel engines, rated at 400 hp. each at 325 rpm. These engines drive 64" x 56" three-bladed Doran bronze propellers, through Tobin bronze tailshafts and Goodrich cutless rubber stern bearings. Special flexible "Fast" couplings and Kingsbury thrust bearings are fitted. Each main engine is direct reversing through a single control handwheel and has a 15 kw. G.E. 110 volt DC belt driven generator mounted above the flywheel. The best fishing vessel practice. The battery set is a 750 Amperehour Gould Cathanode set, having 56 cells and a weight of 10,500 lbs. This is carried in a special tight battery room that has its own suction ventilation system. The auxiliary engines are a pair of 10 kw. Lister sets, developing 15 hp. with 2 cylinders each. These are connected direct to the storage battery set and operate only in the daytime. Switch panels are of the cold front type, made by the K-D Co., of Los Angeles. The very large and diverse electric load makes it necessary to have an elaborate switchboard layout. All piping throughout the entire ship is of wrought iron and all wiring is carried in armored steel cables, after the best approved Navy fashion.

A novel feature of the elaborate control system fitted is the use of two Weston magneto-type tachometers on each of the two main engines. One pair of these new-design instruments are located beside each engine control, and another pair are mounted over the pilot house windows, to the left and right of centerline. The pumping machinery layout is unique. There are two Worthington 2-cylinder V type air compressors, both mounted on special Korfund Spring vibration dampeners. One is driven by a 10 hp. Westinghouse motor and the smaller by a 3 hp. motor of the same make. There is a whole battery ol Worthington special pumps, including a 7½ hp. fire, 2½ hp. bilge and a 1 hp. fuel transfer pump. Large International water filters are fitted, to clarify all fresh water including rainwater from the decks on special occasions. A novel Barnsdall electric evaporator for distilling seawater is also fitted, equipped with a 13,000 watt electric heater and special automatic control. This will deliver 5 gallons of distilled water per hour in operation. A Siroco fan is fitted up to ventilate the after quarters, and another ¾ hp. fan for the crew's quarters. A ½ hp. Duricon fan is fitted to force ventilate the battery room direct into the stack. A large automatic American Radiator Co. fully automatic hot water heating plant is carried on the machinery flat. The elaborate direct current generation and control system for the Sperry metal mike, radio, direction finder and fathometers, etc., are all carried on the starboard side of the machinery flat. There are two Briggs oil clarifiers, a lube and a fuel clarifier, for each main engine, one set mounted on each side of the after part of the machinery flat. These were made by the Briggs people in Washington, D. C., and are somewhat new to the Pacific Coast marine industry. Levelometers, made by the Liquidometer Company, are fitted to measure the contents of each of the fuel, lube and water tanks.

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The upper deck has a genuine old fashioned sturdy pilot house, with padded seat, connecting passage to chart room and the elaborate radio. Mechanically it is the most complete pilot house and navigation setup ever built on a private vessel. There is a 3-A type Kolster radio direction finder; a Sperry metal mike, a 12-circuit Graybar telephone system for intercommunication within the ship; a Submarine Signal Company's fathometer, a Julian Frietz anenometer, the two aforementioned Weston tachometers, a rotary glass windshield, and all the usual compasses, engine room controls, etc., besides. *All in the pilot house.* The radio is a composite 2-way code and telephone set, the largest and most completely automatic ever installed on a private vessel. The radio is 500 watt and the code 350 watt. An 18 in. Sperry spotlight is carried atop the pilot house.

Aft of the pilot house-radio shack-chart room, is a broad topdeck with two 23 ft. Grandy Boat Co. launches, equipped with shelter cabin, toilets and outside open space for gatherin specimens and fishing. One of them is equipp with a small towing engine with 100 fath of ¼ in. steel wire, for small dredging o tions. Each is equipped with a 60 hp. T hill conversion (Continental) gas engin a planetary transmission and reverse gear for speedy handling. Two large steel quadrant davits equipped with G.E. driven screws and a 4-drum 5 hp. G.E. driven winch for lowering each launch overboard. A small Lee Bennett (Seattle) Gypsy is also carried on this space. Outside finish on everything is brilliant white Colfanite enamel.

The main deck forward has a large Bennett windlass driven by a 13 hp. motor, and carrying 125 fathoms of 1 in. stud link chain, and 250 fathoms of ⅞ in. cable. Two 1,000 lb. anchors are carried. The removable hatch cover is also an entrance to the crew's quarters below. A 5-ton cargo hold is directly underneath the hatches, which are of steel and removable when needed. The galley, located just forward of the engine room trunk, is connected to a small dining room. Two staterooms are located forward. The galley is panelled in blue asbestos tile, and has a large galley ice box. Lang oil fired range and sink, but not unlike a modern fishing vessel in appointments.

The large workroom-lounge-saloon occupies the rest of the after deckhouse.

Mounted aft of the deckhouse is a large compound gear driven Bennett towing machine, with a 15 hp. motor, used for dredging, with

Owner's suite on board the "Stranger."

rative that business enter- ture this modern con- prepared to absorb the o such services, or means of Diesel

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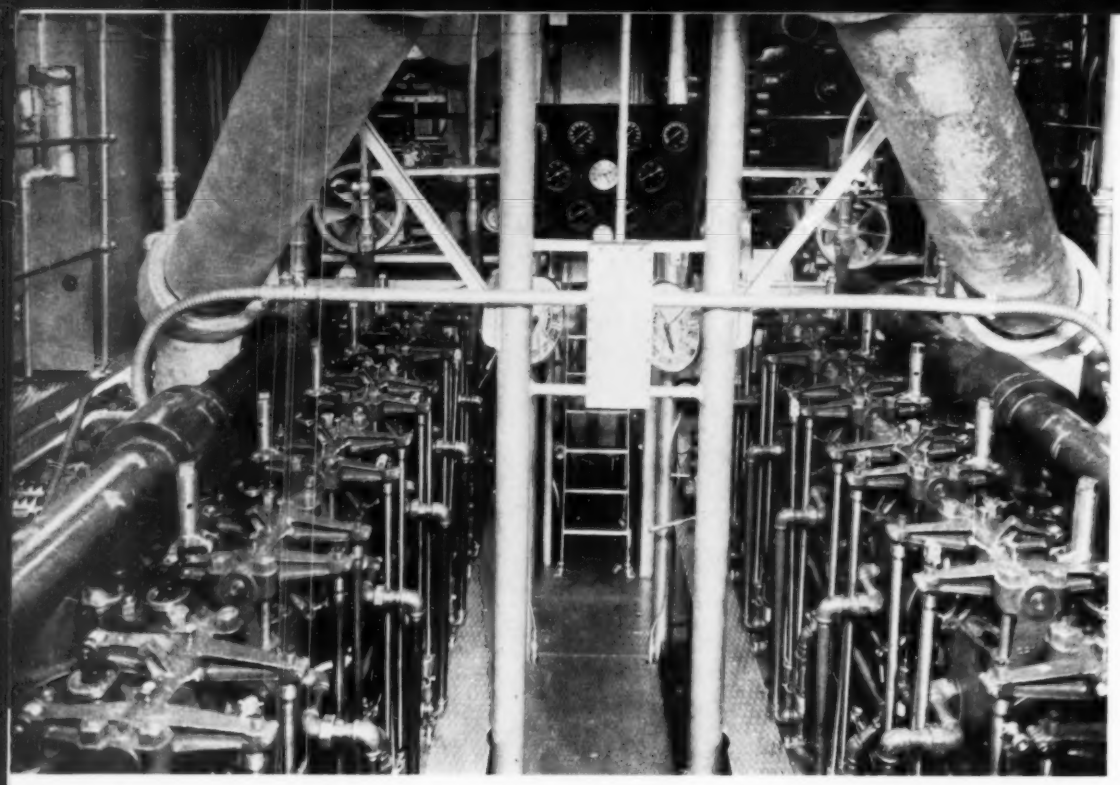
The ice boxes open directly into a c room with removable hatches top and bot to permit easy loading of supplies. Ice machinery is all located on the machinery flat. All reciprocating auxiliary machinery, including the two Lister sets, are mounted on Korfund spring bases.

Crew's quarters, including several staterooms, with private bath — all baths aboard the vessel are showers, incidentally — follow between the forward cold stores and the engine room, giving them a better ride and more space than in the customary place in the bow of the ship.

Aft of the engine room, accessible by stairway from the big maindeck lounge, is the large owner's suite. Of severely simple design and with plenty of cupboard and drawer space built in, this is the pleasantest room on the ship. Equipped with twin beds, shower, bath, closets and writing desk, the room is full width of the hull and done in a soft white enamel finish and teak trim. Connecting with this space are three guest rooms, three more baths and a photographic dark room. All guest rooms are severely plain in design, but tastefully decorated and furnished. But nothing fancy. The large double room aft is likewise a pleasant space, well lighted and furnished.

The *Stranger* will make her home port at Honolulu, carrying the owner from his California ranch to his island estate in British Columbia and to the Hawaiian Islands. After several cruises in the north, the *Stranger,* in command of Capt. Lewis, who is a full fledged licensed navigator, and Mrs. Lewis, accompanied by Mr. L. E. Geary, the designing architect and construction supervisor, left the Lake Union plant on October 15 for the long shake down cruise to Los Angeles. On trials the ship made better than 12.5 knots and was highly satisfactory to her owner in every way.



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Two large Maxim silencers are carried in the lower part of the main stack for complete silencing of the main engine exhaust, and two smaller models are fitted beside them to handle the main engine exhaust. A Wesix (Los Angeles) electric water heater keeps a constant supply of domestic hot water when the galley range is not in operation. Two Alaskan Copper Works (Seattle) heat exchangers are fitted

for the two Lister engines. A small salt water sanitary pump and a ¾ hp. fresh water domestic water pump are carried in the lower engine room. Two Worthington salt water pumps driven by 1 hp. motors are fitted for supplying the main engines. A Penn Electric Switch Co. air volume control meter is fitted on each of the tanks. The Lister auxiliary sets and the main engines have Cuno Autokleen oil filters on them. All radiation throughout the ship is finned copper tubing. To further minimize vibration the exhaust, water, fuel, air and lube lines are all flexibly coupled to the main engine. There are ten welded fuel tanks and four welded water tanks carried each side of the shaft tunnel, of ¼ in. welded steel, with a total capacity of 6,200 gallons of fresh water, 17,000 gallons of fuel and 700 gallons of lube oil, and 700 gallons of gasoline for the launches. Cutler Hammer controls are extensively used, and for the vast battery of electric motors, Century, Westinghouse and G. E. makes are used, with still a fourth set of motors for the Sperry equipment.

The upper deck has a genuine old fashioned sturdy pilot house, with padded seat, connecting passage to chart room and the elaborate radio. Mechanically it is the most complete pilot house and navigation setup ever built on a private vessel. There is a 3-A type Kolster radio direction finder; a Sperry metal mike, a 12-circuit Graybar telephone system for intercommunication within the ship; a Submarine Signal Company's fathometer, a Julian Frietz anenometer, the two aforementioned Weston tachometers, a rotary glass windshield, and all the usual compasses, engine room controls, etc., besides. *All in the pilot house.* The radio is a composite 2-way code and telephone set, the largest and most completely automatic ever installed on a private vessel. The radio is 500 watt and the code 350 watt. An 18 in. Sperry spotlight is carried atop the pilot house.

Aft of the pilot house-radio shack-chart room, is a broad topdeck with two 23 ft. Grandy Boat Co. launches, equipped with shelter cabin, toilets and outside open space for gathering specimens and fishing. One of them is equipped with a small towing engine with 100 fathoms of ¼ in. steel wire, for small dredging operations. Each is equipped with a 60 hp. Thornhill conversion (Continental) gas engine with a planetary transmission and reverse gear for speedy handling. Two large steel quadrant davits equipped with G.E. driven screws and a 4-drum 5 hp. G.E. driven winch for lowering each launch overboard. A small Lee Bennett (Seattle) Gypsy is also carried on this space. Outside finish on everything is brilliant white Colfanite enamel.

The main deck forward has a large Bennett windlass driven by a 13 hp. motor, and carrying 125 fathoms of 1 in. stud link chain, and 250 fathoms of ⅞ in. cable. Two 1,000 lb. anchors are carried. The removable hatch cover is also an entrance to the crew's quarters below. A 5-ton cargo hold is directly underneath the hatches, which are of steel and removable when needed. The galley, located just forward of the engine room trunk, is connected to a small dining room. Two staterooms are located forward. The galley is panelled in blue asbestos tile, and has a large galley ice box, Lang oil fired range and sink, but not unlike a modern fishing vessel in appointments.

The large workroom-lounge-saloon occupies the rest of the after deckhouse.

Mounted aft of the deckhouse is a large compound gear driven Bennett towing machine, with a 15 hp. motor, used for dredging, with 1,500 ft. of ⅞ in. wire rope. This operates the dredge for bringing up bottom samples. A couple of skiffs are carried aft.

Below decks, in the forepeak, besides the chain locker there are two large ice boxes, one of low temperature that will carry 6 tons of meat and a cool room for dry stores of 10 tons capacity, enough storage for 6 months away from supply bases. To cool this group of ice boxes, besides the large galley box, there are 5 Frigidaire sets, two 3 hp. sets and two 1½ hp. sets and a 1 hp. set for the galley box. This dual system assures constant low temperatures at all times. An Electrolux ice box is also fitted in the dark room for film storage in the tropics.

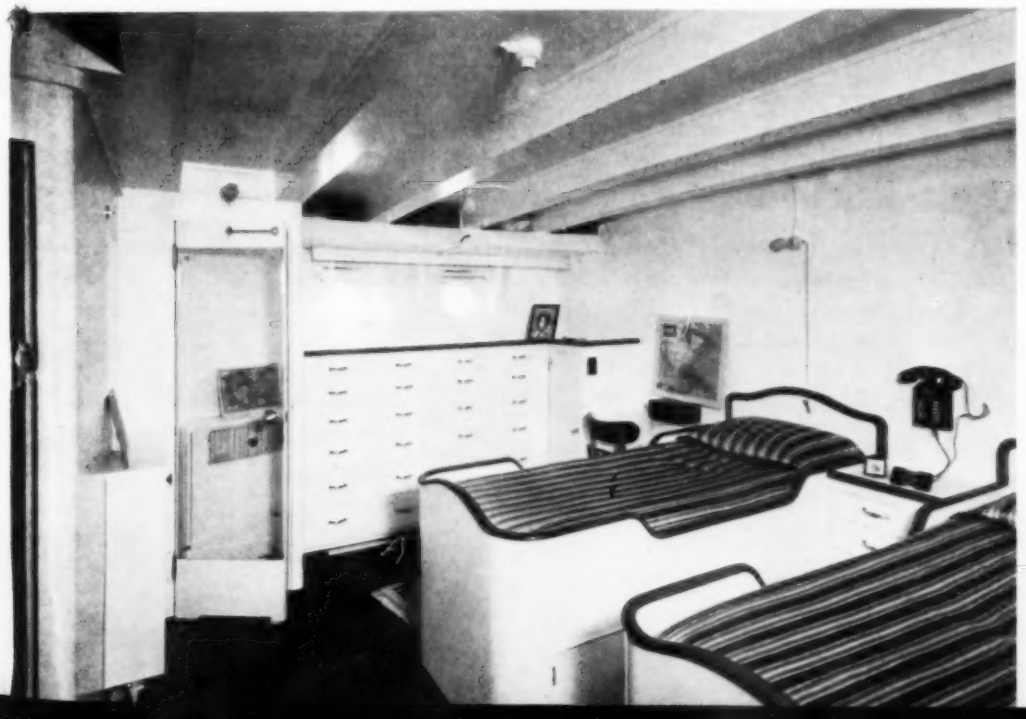
The ice boxes open directly into a crew's wardroom with removable hatches top and bottom to permit easy loading of supplies. Ice machinery is all located on the machinery flat. All reciprocating auxiliary machinery, including the two Lister sets, are mounted on Korfund spring bases.

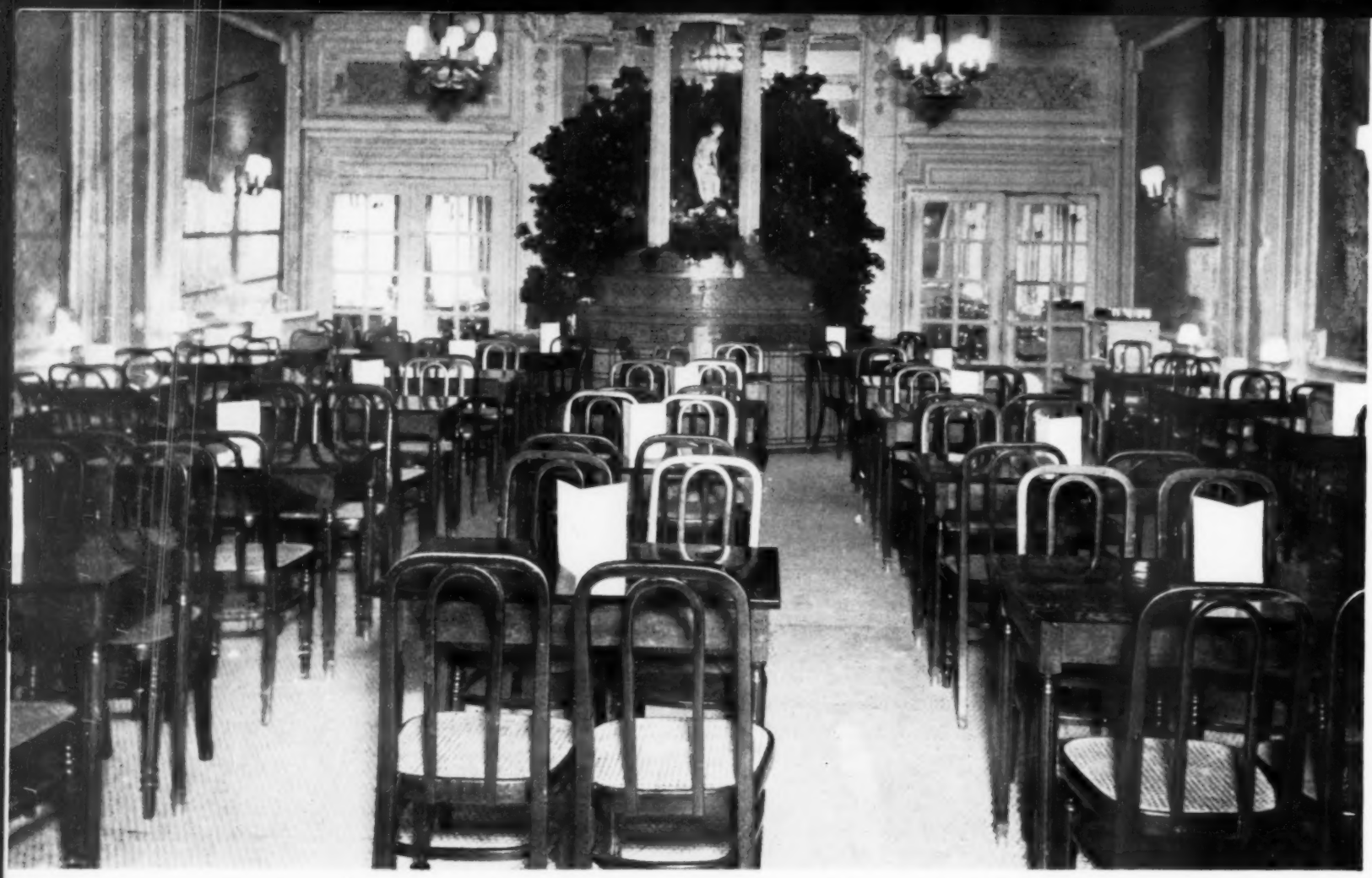
Crew's quarters, including several staterooms, with private bath — all baths aboard the vessel are showers, incidentally — follow between the forward cold stores and the engine room, giving them a better ride and more space than in the customary place in the bow of the ship.

Aft of the engine room, accessible by stairway from the big maindeck lounge, is the large owner's suite. Of severely simple design and with plenty of cupboard and drawer space built in, this is the pleasantest room on the ship. Equipped with twin beds, shower, bath, closets and writing desk, the room is full width of the hull and done in a soft white enamel finish and teak trim. Connecting with this space are three guest rooms, three more baths and a photographic dark room. All guest rooms are severely plain in design, but tastefully decorated and furnished. But nothing fancy. The large double room aft is likewise a pleasant space, well lighted and furnished.

The *Stranger* will make her home port at Honolulu, carrying the owner from his California ranch to his island estate in British Columbia and to the Hawaiian Islands. After several cruises in the north, the *Stranger,* in command of Capt. Lewis, who is a full fledged licensed navigator, and Mrs. Lewis, accompanied by Mr. L. E. Geary, the designing architect and construction supervisor, left the Lake Union plant on October 15 for the long shake down cruise to Los Angeles. On trials the ship made better than 12.5 knots and was highly satisfactory to her owner in every way.

Owner's suite on board the "Stranger."





Thode's Restaurant, Air Conditioned by means of a Diesel-electric Plant.

AIR CONDITIONING

With a Diesel Engine

By B. J. VON BONGART

THE success of a restaurant depends essentially upon three fundamentals, namely:

1. Upon the quality of food sold at a given fair price.
2. Upon the body comfort patrons enjoy while dining.
3. Upon the elimination of wasteful overhead expenditures.

Of course, it must be admitted that there are a number of factors that play a role in the success of a restaurant, such as the character of the help employed, location of the restaurant, general attractiveness, etc. However, the three fundamentals as enumerated differentiate between success and failure, generally speaking.

Thode's, Inc., at New Brunswick, New Jersey, is not a new restaurant, but a rejuvenated one. The predecessors had to close up because their food prices were too high, and they were that because the overhead was too high. And the latter was high because there were not sufficient guests upon whom to spread the overhead, and there were but few guests because the food prices were too high. An altogether vicious cycle!

Thode's is a restaurant combined with fountain service and also embraces a candy department; incidentally, the latter product being made at the premises.

The first measure inaugurated was to reduce food prices to a level that people would be willing to pay in a town of some 35,000 inhabitants, a town boasting one of America's oldest colleges (Rutgers University), but totally lacking the sporting element one finds in New York, Chicago, Miami or Hollywood.

In order to eliminate useless overhead, a Diesel engine was installed to generate electricity for both light and power. It was the first small installation in New Brunswick – it is not the only one today – and constituted pioneer work.

The engine is a 36 hp. 2 cylinder 2 cycle Deutz Diesel, driving an A.C. generator. The installation is one of the most unique the writer has ever seen. It is installed in an old ice-box to eliminate noise and vibration!

Formerly, when foods, and principally meats, were kept on ice, there was a need for a large ice-box, which incidentally entailed a great expenditure. The Diesel engine installation permitted electric refrigeration wherever needed, kitchen, candy department, fountain service, etc., hence the huge ice-box was no longer required. But since it was of heavy construction

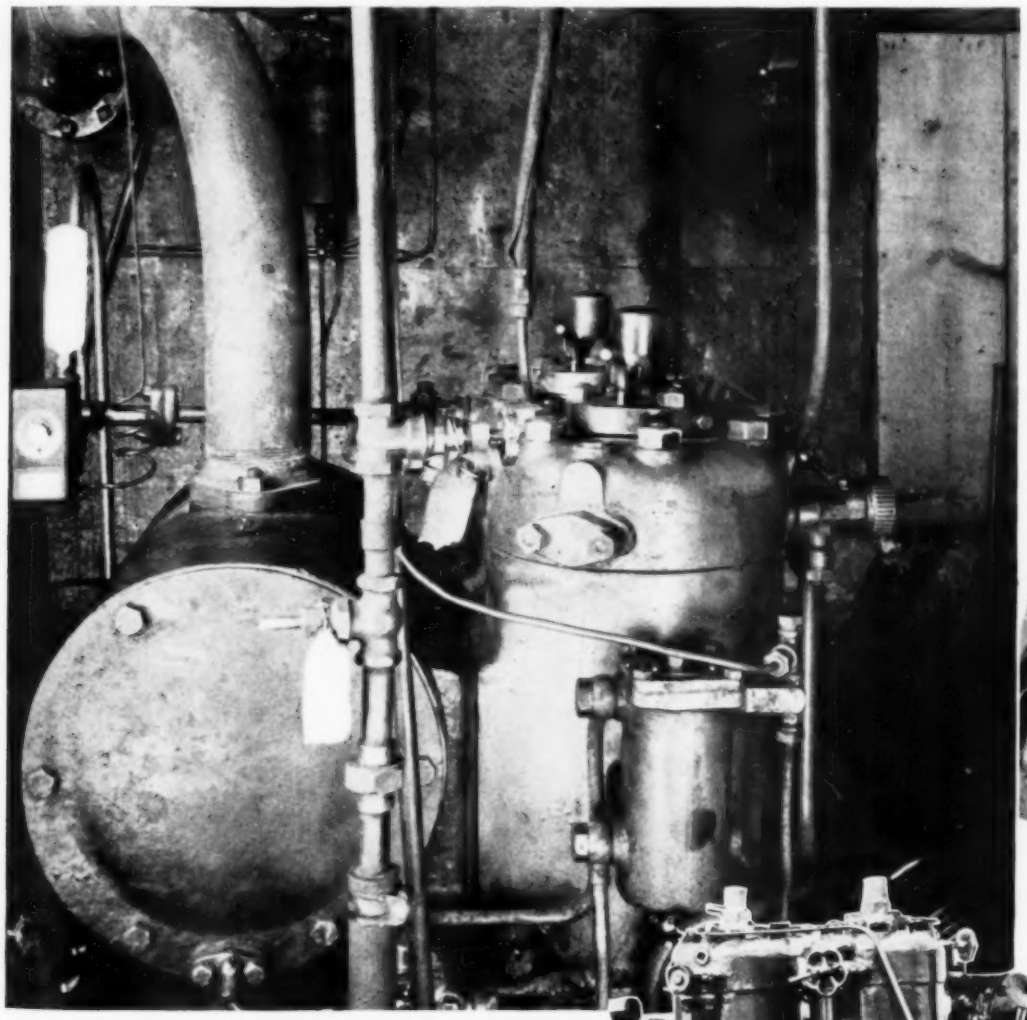
and cork lined, it was decided that this was the ideal spot for the Diesel-electric plant, since the tight-fitting box would muffle the engine's noise and the cork lining would absorb whatever vibration there might be. It is an ideal arrangement and in this particular case it saved a considerable amount of installation costs.

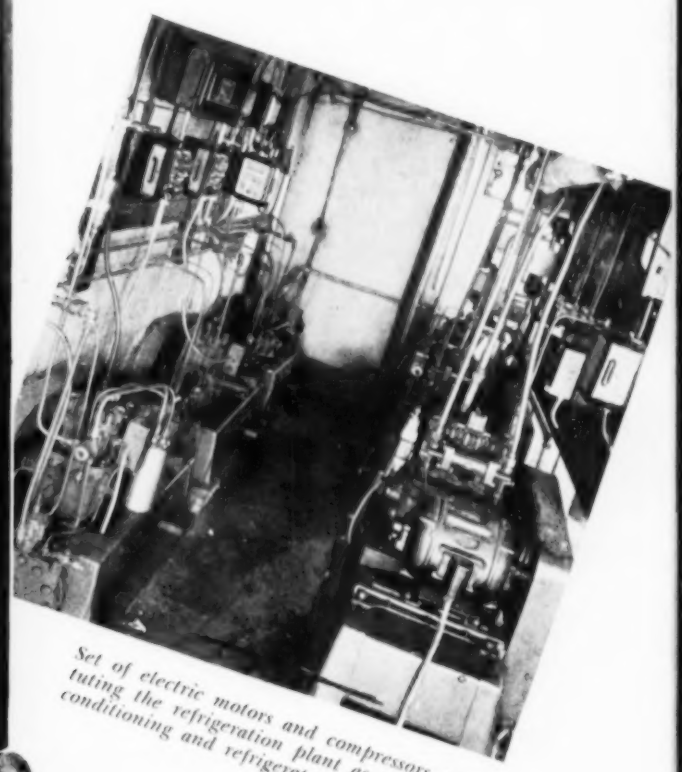
The engine and its generator were purposely chosen "over-size," i.e., larger than they needed to be for light and power. This gave extra capacity for air conditioning the restaurant. And here again, Thode's was the first restaurant in New Brunswick featuring this modern convenience, but it is not the only one today. This, then, proves that relatively small business enterprises can successfully generate electricity with Diesel engines and at a cost so far below that of a public utility, that such a plant pays for itself in but a few years.

The Diesel engine operates from 8 A.M. to 12 midnight or 16 hours per day the year around. Total expenditures amount to $60 per month, which furnishes light for the entire establishment plus light sold to a tenant. And in addition power for the making of candy and for all sorts of electric utensils used, and – air conditioning! Normally, the latter alone would entail an expenditure of no less than $100 per month with utility furnished electricity, whereas in this particular instance air conditioning is actually cost-free!

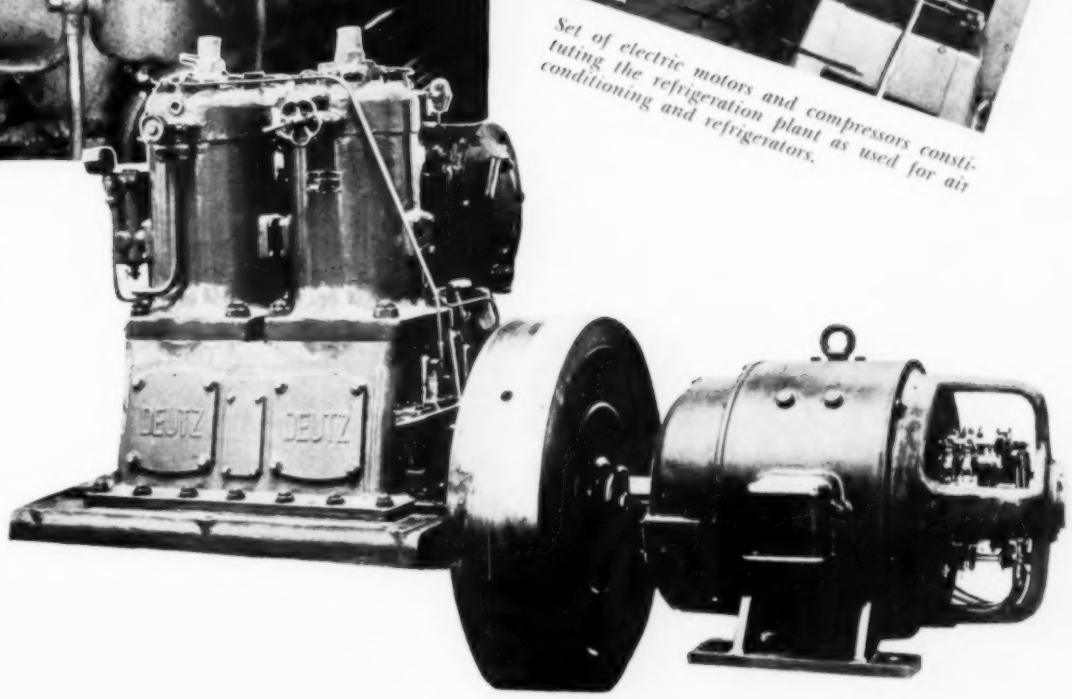
Therefore, it is imperative that business enterprises wishing to feature this modern convenience must either be prepared to absorb the high overhead incidental to such services, or produce low-cost electricity by means of Diesel engines.

Air conditioning is a virgin field for the Diesel engine and it is safe to predict that such installations will be made in really great numbers once business men have become acquainted with their low operating costs. As Mr. Thode stated, the Diesel-electric plant and the air conditioning equipment is being paid off by as much yearly as is saved on the electric bill. It will take from three to four years to do so, but the Diesel engine and its auxiliary equipment is no extra burden to the business because it pays for itself. And once it is paid for in full, it will be a source of revenue for years to come.





Set of electric motors and compressors constituting the refrigeration plant as used for air conditioning and refrigerators.



(Above) The Diesel-electric power plant as installed within a huge ice box.

(Right) Deutz 36 hp. 2-cylinder 2-cycle Diesel engine with A.C. generator. The scavenging air is furnished by piston-type compressors actuated from the engine's connecting rods.

WHAT IS LANOVA?

By B. J. VON BONGART

WHILE frequent reports have come out during the past years about the Lanova Combustion system, little indeed seems to be known about the scope of the enterprise and practically nothing about the patent situation which is the very foundation of Lanova.

The Lanova Corporation was formed in 1931 and incorporated under the laws of the State of Delaware. It is engaged in the business of:

1. Granting sub-licenses to build, manufacture and sell Diesel engines embodying the Lanova combustion system.

2. Carrying on research and experimental laboratory work for the further development of the Lanova system, particularly in connection with combustion and fuel injection.

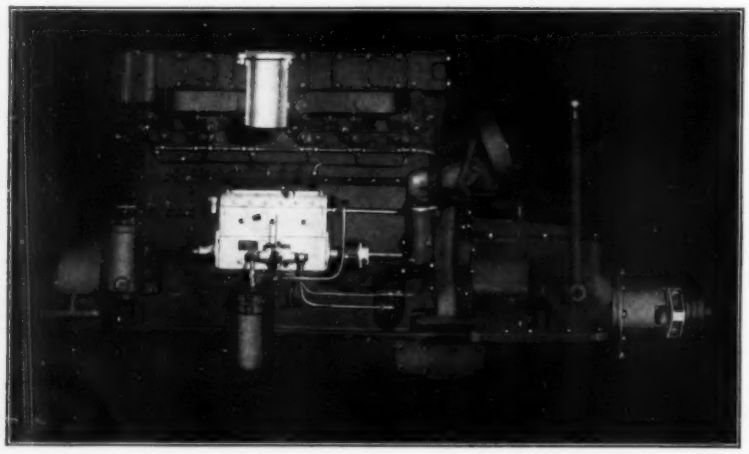
The inventions relating to Diesel engine combustion chambers, known as the Lanova patents, are the result of many years of scientific research by one of the oldest pioneers in the Diesel field, Dr. Lang of Munich, who has been active in Diesel engine development work for over 40 years. He was associated with Dr. Diesel in his early research work and is the inventor of the first compressorless Diesel engine, known as the Vogel Diesel, which was exhibited at Turino, Italy, in 1911. It was in connection with the so-called Vogel Diesel that Franz Lang's name as an inventor first became prominent.

After the World War, Franz Lang realized that small high-speed Diesel engines would offer a better field than slow speed ones. But, for high-speed performance, injection pumps and nozzles as well as a suitable combustion chamber had first to be developed. He began with his research work along these lines in 1918, and as a result of his efforts there appeared in 1922 the first high-speed Diesel engine. The patents under which fuel injection pumps and nozzles, as well as the combustion chamber layout, were built, became known as the Acro patents. All these patents were sold in 1925 to the firm of Robert Bosch, A.G. of Stuttgart, Germany, and the nozzles and pumps as manufactured by the firm of Bosch are internationally known today; they were the first commercially produced pumps and nozzles for Diesel engines on the world's market. The combustion system developed by Franz Lang, also known as the Acro System, deserves mentioning because it became known as the air chamber Diesel engine.

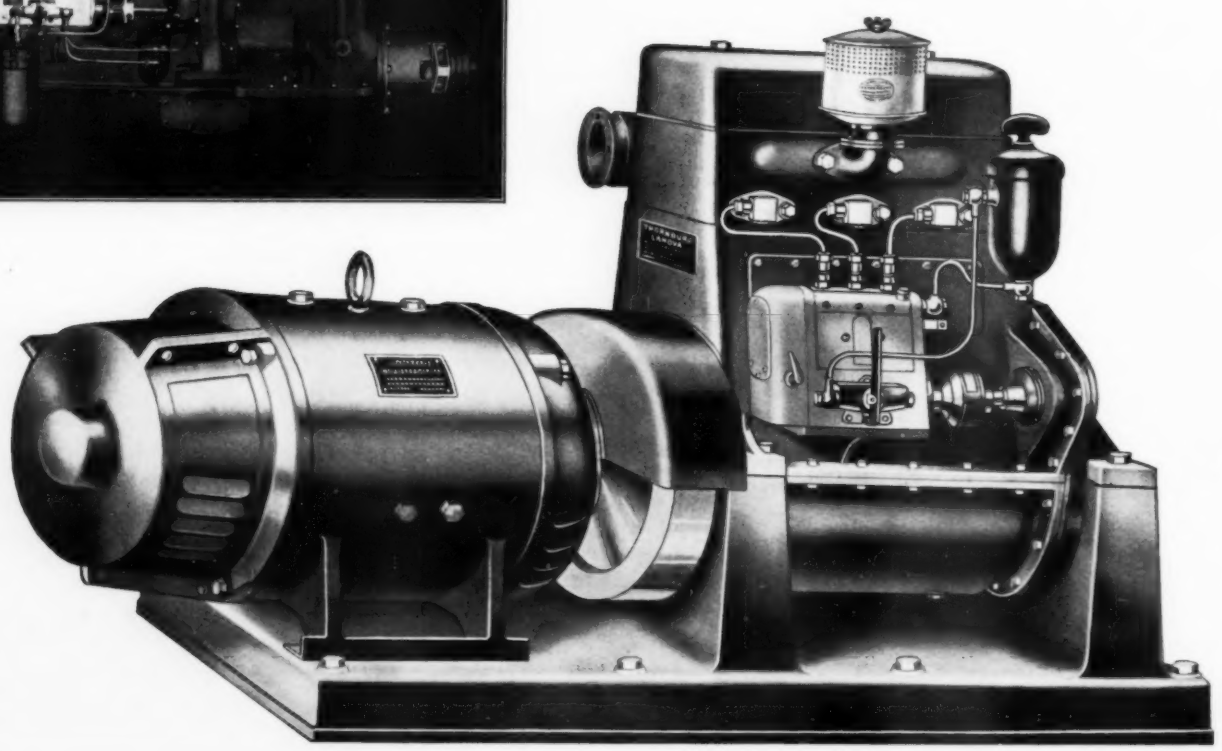
Although the Acro Combustion System was considered excellent at that time for high-speed Diesel engines, the very meaning of high-speed underwent a change, i.e., what was considered high-speed in 1918 was but medium speed in 1928 (it would be called slow speed today).

Thus, in 1928, Franz Lang began with new researches based upon different conceptions and the fruit of his work crystallized into what is now known as the Lanova Combustion System. Lanova is a compound word made up of *La* and *nova* (the former from Lang and the latter from the latin word *novum*, i.e., new) hence Lanova means the "New-Lang" (combustion) system. This is to distinguish it from the former Lang system known as the Acro.

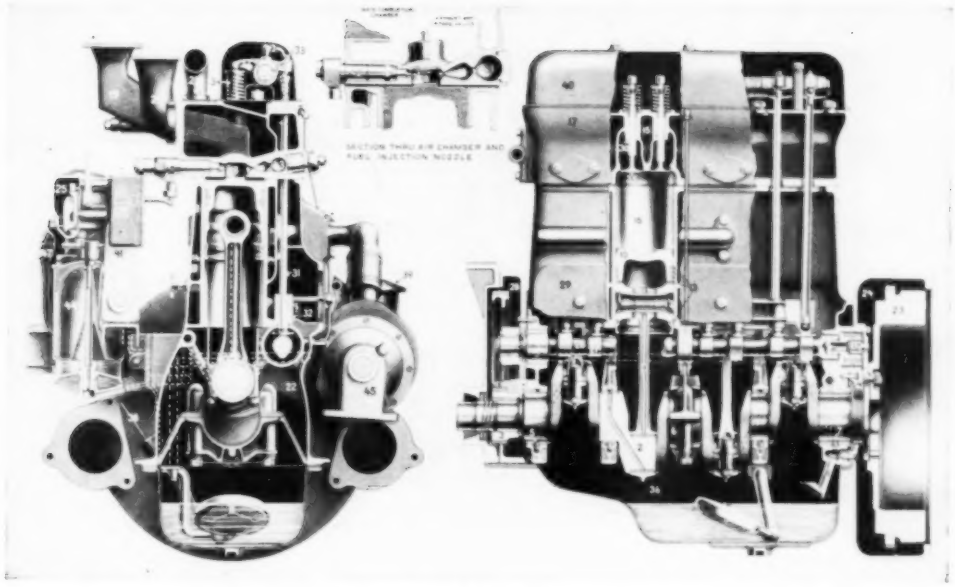
The inventions of Franz Lang's new combustion system are now known as the Lanova Combustion; they are now covered by over 200 patents and patent applications in 19 countries. All of the Lanova patents under which sub-licenses are granted cover inventions with respect to combustion. Such licenses may be acquired by manufacturers of Diesel engines or by those building gasoline engines. For the



Buda - Lanova Marine Diesel.



Thornburg - Lanova 15 hp. generator set.



Cross-section of Buda-Lanova Diesel engine.

latter, it involves conversion, i.e., the gasoline engines must be adopted for Diesel operation which not only involves the substitution of the Lanova cylinder head construction but also the discarding of the ignition and carbureting systems and the substitution of fuel injection pumps and nozzles.

The Lanova Corporation maintains a fully equipped laboratory in New York City to make conversions and to do research work. Its engineering staff is headed by Messrs. Hans Fischer and Henry Flood, Jr. It might be interesting to note that Mr. Fischer has had over 36 years of experience with Diesel engines.

The Lanova Combustion System itself has been described many times and it is assumed that the reader is sufficiently familiar with its features. The patent situation, however, may be quite obscure to those outside of the narrow circle of Diesel technicians. In this field, the work of Dr. Klaften* is illuminating indeed. In his book, *The Air-Chamber Diesel Engine*, he divides the air-chamber Diesel engines into five classes, namely:

1. The precursors.
2. The Acro Diesel engines.
3. The M.A.N. and others.
4. The Lanova Type.
5. Extraneous air-chambers.

While the air-chamber idea originated with Dr. Diesel, being part of his original patent of 1892, Dr. Klaften begins his list of the precursors with the American patent of E. A. Ford. No. 1,165,086, applied for January 13, 1911, and granted on December 21, 1915.

Patents falling within class 1 of the above division have either expired or are dormant and are, therefore, of no practical value today, and hence may be dismissed from further discussion. As to classes 2, 3, 4 and 5, Dr. Klaften states (page 166) as follows: "Opinions and expectations are of no decisive importance, the success will determine in the long run which one of the four classes will emerge victorious."

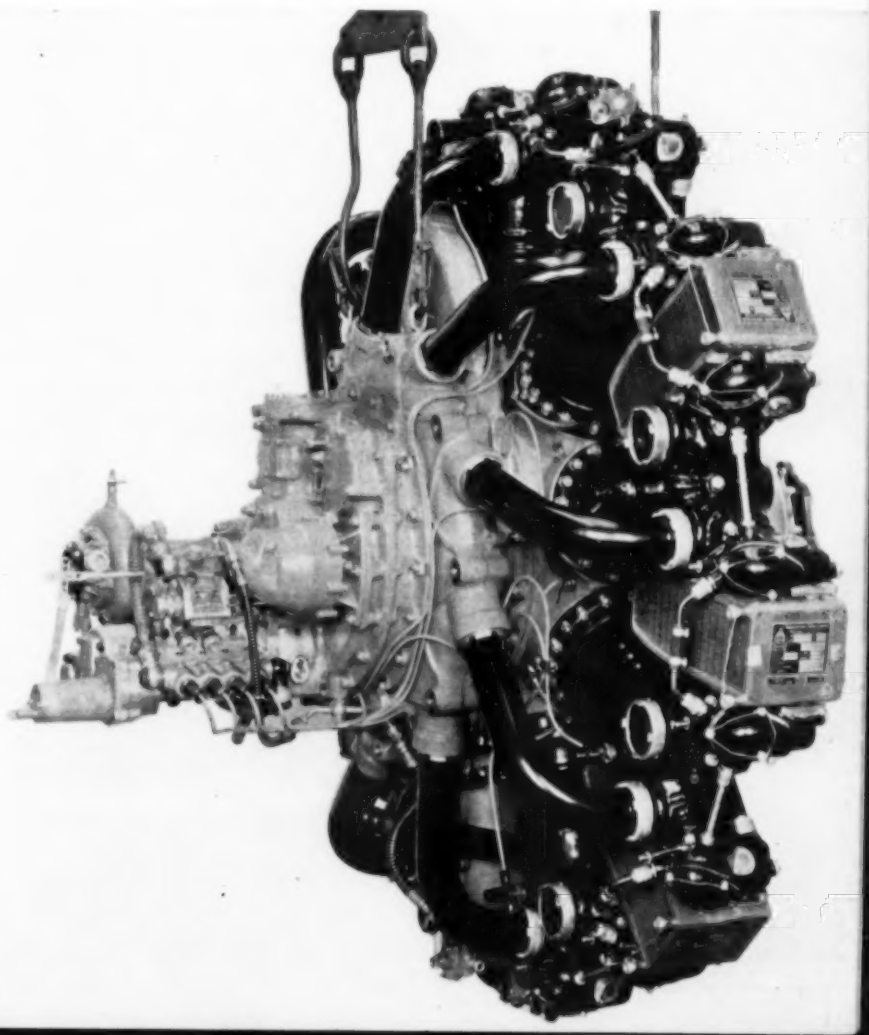
Since the practical value of constructions as exemplified in class 5 seems doubtful, there remain but classes 2, 3 and 4 to consider. The Lanova Air-Chamber type (class 4) is protected in the United States by no less than 20 patents and 8 additional patents are pending.

There are 16 U. S. patents for the air-chamber constructions of class 2 embracing the Acro designs, and 2 patents of class 3 which are held by the M.A.N.

While the Acro patents in many instances are outmoded in their practical applications for today's high-speed Diesel engines, nevertheless, the very broad claims embodied and granted in some of the early Acro patents make it well-nigh impossible for newcomers to successfully enter the field of air-chamber constructions.

The Acro patents are controlled in the United States by the Lanova Corporation, and the latter possesses also far reaching rights under the U. S. M.A.N. air-chamber patents. Since the Lanova Corp. owns all of the U. S. Lanova patents and applications, it places the Lanova Corporation in an enviable position in so far as the air-chamber Diesel field is concerned. The Lanova patents proper are of recent origin and a survey will show that they embody today's practices and represent the late developments in this highly specialized field.

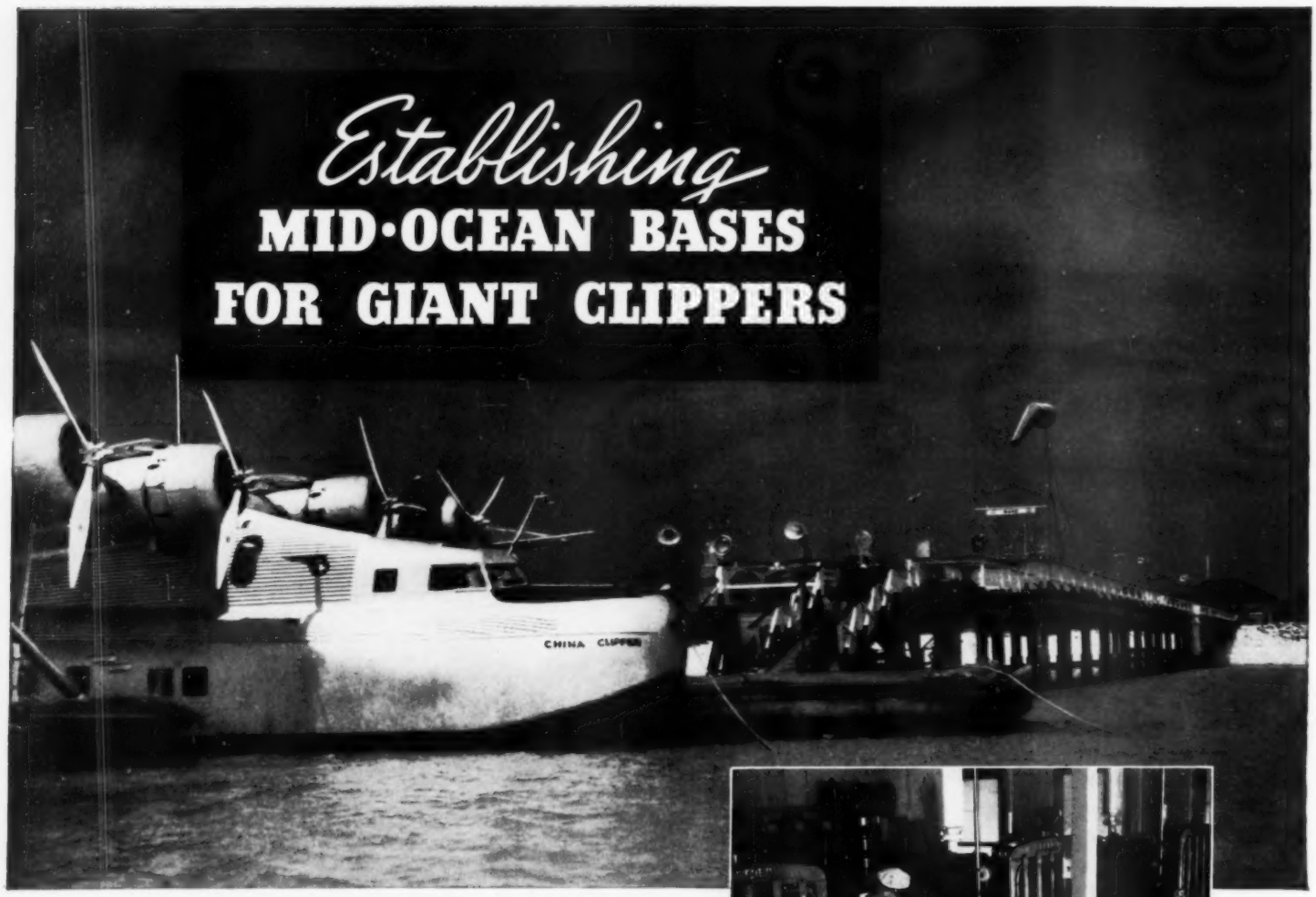
It would go too far beyond the scope set for this article to illuminate and illustrate the numerous constructions in the air-chamber field, hence the foregoing can be but a resumé rather than a complete dissertation.



B.M.W.-Lanova Aviation Diesel Engine.

*Dr.-Ing. Berthold Klaften, *Die Luftspeicher Dieselmaschine*, Berlin, 1932. Dr. Klaften in his capacity as Government Adviser and Member of the German Patent Office (Dept. of Research) wrote the above book on Air-Chamber Diesel engines at the official request of the President of the German Patent Office. The book is thus of a quasi-official nature and may be considered authoritative in its scope.

Establishing MID-OCEAN BASES FOR GIANT CLIPPERS



Approximately four thousand miles from San Francisco, as the Clipper flies, a Pan American Airways pilot makes ready to land! Whether at Midway Island (near the International Date Line) or at Wake (due west of Hawaii) he glides his Clipper Ship via radio beam down to a safe landing! Here on these tiny isles in Mid-Pacific, now important outposts of the future, he prepares to conquer the rest of the world's largest ocean!

DESOLATE sand spits in 1935 — today Wake and Midway Islands are as modern as America. Electric lighting, automatic refrigeration, modern water supply and radio communication — all are there!

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On construction jobs, in power plants, in the woods and on the farm, "RPM" Diesel Engine Lubricating Oil is helping Diesel tractor owners to earn more profits.

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STANDARD OIL COMPANY OF CALIFORNIA
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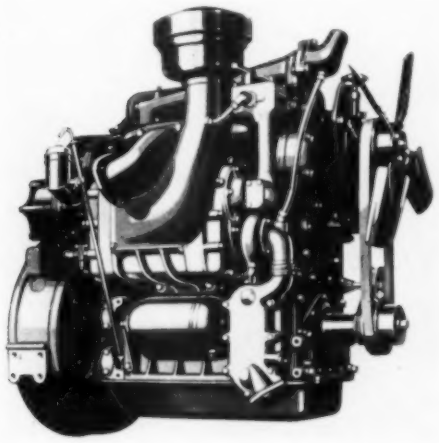
Get in touch with your nearest distributor—for a clean engine, and long hard service with the minimum of overhaul.

DIESELS DOMINATE TRUCK SHOW

WHEN the National Motor Truck Show opens in New York on November 11, Diesel engines and Diesel trucks will steal the Show. A number of important and far-reaching announcements appear hereunder. The fact that General Motors Corporation, Chrysler Corporation, and Mack will all be at the Show with new Diesel engines and new Diesel trucks, plus the announcement of Hercules Motors Corporation with their Diesel conversion unit for Ford V8 trucks and the Buda Company with a similar product for Ford trucks, the Dieselization of our truck industry marches forward with a firm determined tread.

GMC ANNOUNCES 12 NEW DIESEL TRUCKS

TWELVE new Diesel models—six conventional and six cab-over-engine models especially designed for the medium and heavy duty truck field—all powered with the new General Motors Diesel engines, are announced for 1939 by General Motors Truck and Coach Division. Because of the inherent advantages of Diesel



General Motors Truck Diesel

engines—their high sustained torque, their fuel economy, and their ability to burn cheaper fuels—General Motors engineers have been concerned for some time with the design of a Diesel engine suitable for trucks. The result is a different principle of basic design, a modern two-cycle Diesel truck engine which has lighter weight, smaller size, and smoother power. These modern GM two-cycle Diesels are approximately the same size and weight as GMC gasoline engines designed for the same over-all performance in any given truck operation. Safety is assured with the GM modern two-cycle Diesels because there is no fuel hazard and carbon monoxide is absent in Diesel exhaust.

The six conventional models and six corresponding cab-over-engine models offered in the GMC Diesel field cover the gross vehicle range from 35,000 down to 15,000 pounds. This application of the Diesel to cab-over-engine models is another feature of GMC's Diesel announcement—GMC alone offering the combined advantages of cab-over-engine and Diesel throughout this capacity range.

The highest ratio of torque to displacement in the truck industry is found in the GM four-cylinder, modern two-cycle Diesel. With only 284 cu. in. displacement, this engine has a torque range of 308 to 350 ft. pounds. This engine is used in the GMC 700 and 850 series, designed especially for the tough, heavy-duty truck operations.

GM's two-cycle, three-cylinder Diesel, which has 213 cu. in. displacement, developing from 230 to 263 ft. pounds of torque, is offered in GMC's 600 series.

HERCULES DIESEL FORD CONVERSION

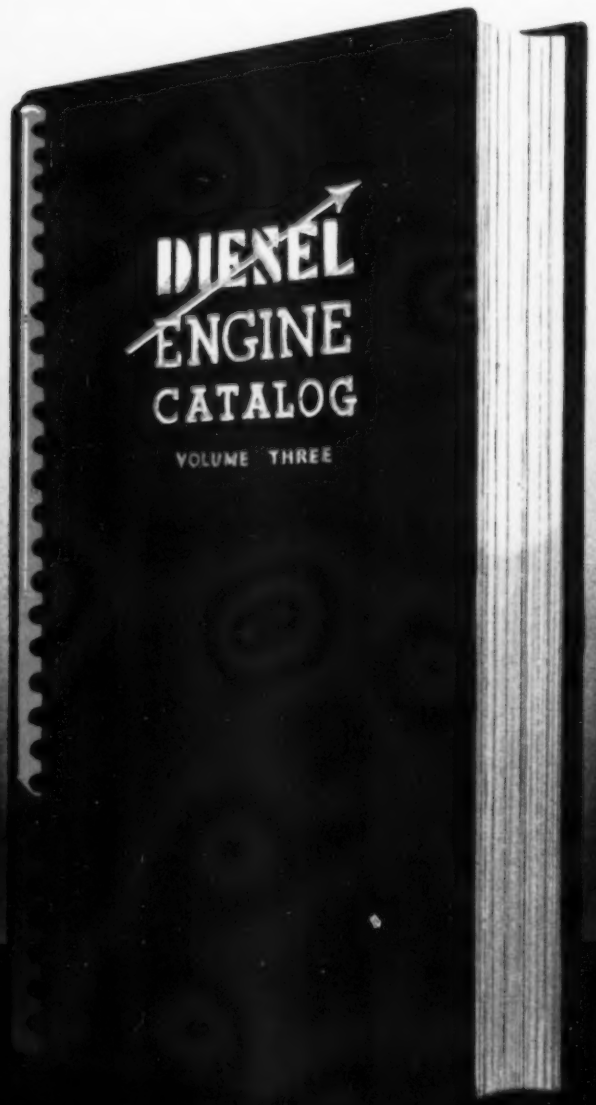
Hercules Diesel Ford Conversion

HERCULES MOTORS CORPORATION will exhibit at the leading automobile and motor truck shows a complete power package consisting of a Hercules Diesel engine replacement for Ford V8 Trucks for the years 1935 to 1939, inclusive. The engine is the 4-cylinder Her-

. . . . . *And now please turn to page 50*

DIESEL ENGINES

NINETY SEVEN DIFFERENT MODELS



Ninety-seven Diesel Engines

Described in Detail by . . . **B. J. VON BONGART**
Aviation Section by . . . **PAUL H. WILKINSON**
288 Pages—10¼″ x 13½″—704 Illustrations

$3.00

THE DIESEL ENGINE CATALOG

THIS new book on Diesel engines is entirely different from any other book published on the subject. In this new book ninety-seven Diesel engines are described in detail, illustrated in color and in full section.

B. J. Von Bongart, author of the new book "Diesel Engines," and technical editor of DIESEL PROGRESS, one of the most experienced and best known engineers in the Diesel industry, has described in intimate detail these ninety-seven Diesel engines. In this book he goes into the matter of individual design, discusses the features of design of each engine in clear cut, thoroughly understandable manner and makes it possible for the reader to grasp readily and quickly the difference between the various makes and types of engines now available on the market. He makes it possible to select from these ninety-seven different models the one engine fitted to the job in mind.

Beautifully illustrated in color, with sectional drawings visualizing with complete clarity the design features of each engine, this new book brings you under one cover a marvelously clear picture of the engines now available. Right up to the minute, as modern as tomorrow, printed on a big page size (10¼″ x 13½″) to make the illustrations readable, this new book is indispensable to the Consulting Engineer, Diesel Salesman, prospective Diesel engine buyer—yet the price is but $3.00 postpaid.

We offer you this new book, believing it to be the finest book of its type ever produced, authoritative, informative, beautifully printed and bound—a book you will be proud to own, a book from which you will obtain much useful information. May we hope you will use the coupon hereunder today—now?

Diesel Engines Described

Alco Four Cycle Stationary
Alco Locomotive Type
Alco-Sulzer Types "T" and "TM"
Alfa Romeo 2-cycle Automotive Engines
Allis-Chalmers Oil Engines
Atlas Imperial Stationary and Marine Diesels
Ball-Muncie Vertical and Horizontal Engines
Bristol "Phoenix" Diesel
Buckeye Heavy Duty Type Diesel
Buda-Lanova Automotive and Marine Diesels
Busch-Sulzer Bros. 2-cycle
Busch-Sulzer Bros. 4-cycle
Caterpillar Industrial Engines
Caterpillar Marine Engines
Chicago Pneumatic Model 8-CP
Chicago Pneumatic Type RHB
Chicago Pneumatic Type RHB-100
Clerget Aviation Diesel
Coatalen Aviation Diesel
Cooper-Bessemer Type EN
Cooper-Bessemer Type GN
Cooper-Bessemer Type JTB
Covic Industrial, Marine and Automotive Diesels
Cummins
De La Vergne Type VA
De La Vergne Model VB
De La Vergne Model VE
De La Vergne Model VG
De La Vergne Model VM
De La Vergne Model VO
Deschamps Aircraft Diesel
Deutz Diesel Engines
Diesel Marine Auxiliary Units
Enterprise Marine and Stationary Types
Fairbanks-Morse, Types 33 and 37
Fairbanks-Morse, Model 36-A
Fairbanks-Morse Model 36-A-8
Fairbanks-Morse Model 42-E
Fairbanks-Morse Models 32 and 35
General Motors Model 71 2-cycle Engines
General Motors Model 567 2-cycle Engines
Gray Marine Diesels
Guiberson Aviation Diesel
Hall-Scott "Chieftain"
Hamilton-M.A.N. Double Acting Engines
Hercules Automotive Diesels
Hill Diesels Models A, B, and C
Ingersoll Rand Type "S"
International Harvester—Four and Six Cylinder Types
Junkers Jumo 205 Diesel
Kahlenberg Marine and Stationary Engines
B. M. W. Lanova Aviation Diesel
Lister Small Stationary Diesels
Lorimer Slow-Speed Heavy-Duty Diesels
Murphy MD Series
Napier Culverin Diesel
Nordberg 4-cycle
Nordberg 2-cycle
Northeastern Diesel Engines
Power Manufacturing Company
Ruston-Hornsby—Horizontals
Sterling Crankless Diesel Engines
Stover Single Cylinder Diesel
Superior Model "A"
Superior Model "D"
Superior Type M
Superior Type S
Thornburg High-Speed Diesel Engines
Venn-Severin Model "D" Type "M"
Victor Horizontal Type
Waukesha—Hesselman Type
Waukesha—Comet Diesel
Weber Horizontal Engines
Weber Vertical Engines
Western—Type DS
Witte Horizontal and Vertical Types
Worthington Four-Cycle Diesel Engines
Z. O. D. Aviation Diesel

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DIESEL PROGRESS—Two West Forty-Fifth Street—New York City

Enter my order for a copy of the DIESEL ENGINE CATALOG, Volume Three, for which I enclose $3.00—it being understood that shipment will be made postage prepaid.

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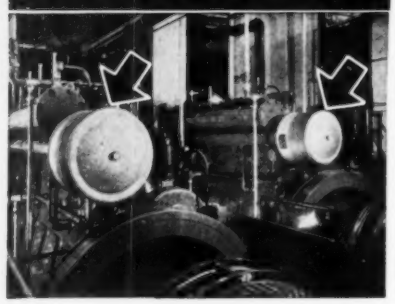
How to CLEAN and SILENCE Your Diesel Intake



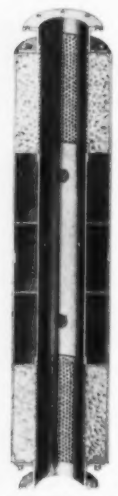
with LOW RESTRICTION

Burgess IRCF intake silencer and air cleaner.

Silencing Diesel intake noises and at the same time removing all dust from the intake air is a man-sized job for any single unit. But doing this without unduly restricting the flow of intake air is even more difficult. Yet, that's what the Burgess combination intake silencer and air cleaner does.

There are no baffles in Burgess intake silencers. They pass intake air with a minimum of restriction. This is made possible by the Burgess **patented** construction which blots up high-pitched noises. Low-pitched noises are suppressed by reactance chambers.

Burgess also offers a complete line of exhaust mufflers. Write Burgess Battery Co., Acoustic Div., Dept. DPR, 500 W. Huron St., Chicago.



Burgess CA straight-through intake silencer.

In England
Burgess Products Co., Ltd.,
Barwell, Leicester.

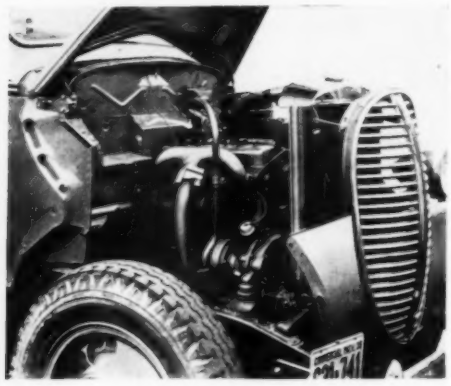
BURGESS

AIR CLEANERS AND SILENCERS, MUFFLERS, ENGINE HOODS, CAB TREATMENT, QUIET VENTILATION SYSTEMS

Manufactured under Burgess Patents

NEW YORK TRUCK SHOW

. . . . *Continued from page 47* . . . .

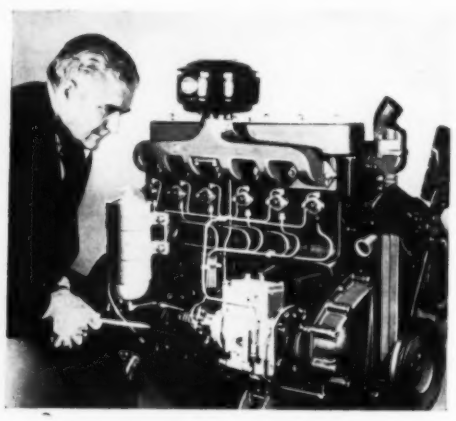


Hercules Diesel in Ford Truck

cules Diesel, Model DOOC, 4" x 4½". This engine is identical in mounting dimensions with the standard Ford V8 gasoline engine and all parts needed to effect complete change-over to full Diesel power are included in the unit-package. No major changes in the Ford V8 chassis, frame or dash assembly are necessary.

DODGE ANNOUNCES NEW DIESEL

DODGE TRUCK DIVISION of Chrysler Corporation, after a decade of unpublicized experimentation and development, will enter the Diesel engine field in 1939 with a Dodge Diesel 3-ton truck, according to an announcement made by J. D. Burke, Director of Truck Sales.



The Dodge-Lanova Diesel

The Dodge Diesel engine will be displayed at the National Automobile Show in New York's Grand Central Palace, and the 3-ton Diesel truck model will be exhibited in the Dodge truck exhibit at the National Motor Truck Show, Port of New York Authority Building, next month.

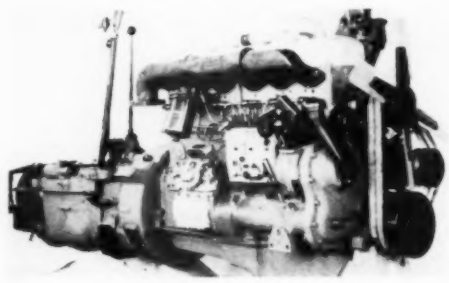
Emphasizing that the Diesel would be available only in 3-ton trucks, Burke said: "We have subjected our experimental models to the most rigorous tests the past several years and are now firmly convinced we have corrected previous deficiencies such as, for example, 'Diesel knock,' smoking and starting difficulties."

Because it has been proved that Diesels are most profitable in heavy duty continuous operations, Dodge has developed its Diesel for 3-ton trucks rather than for lighter models.

The new Dodge Diesel engine has full length water jackets, a by-pass thermostat, chain driven camshaft, precision type bearings, full pressure lubrication and aluminum alloy pistons. It is a 4-cycle, 6-cylinder engine having 331 cu. in. displacement. The bore is 3¾ in., the stroke 5 in., the crankshaft has 7 main bearings. Burke said that Dodge's new Diesel engines will be manufactured in the Dodge plant.

MACK ANNOUNCES A NEW DIESEL

MACK TRUCKS, Inc., the oldest exclusive truck manufacturers in the United States, will exhibit a line of Diesel-engined trucks at the coming Truck Show.



The Mack-Lanova Diesel

This firm has experimented with Diesel truck engines for the past eleven years, having built a great variety of experimental engines as well as having bought different makes of Diesels for installation in Mack trucks.

Their new line of Diesel-engined trucks will consist of Mack-Lanova engines built at the company's own shops at Plainfield, N. J. This move on the part of Mack Trucks, Inc., is in keeping with the company's policy of building complete trucks at their shops rather than purchase engines on the open market.

That the company after years of exhaustive tests has finally adopted the Lanova type of combustion chamber speaks for itself. Full details of the Mack-Lanova Diesel engine are scheduled to appear in the December issue of DIESEL PROGRESS.

BURGESS SELLS PART

THE Research Products Corporation, with offices and plant at Madison, Wis., has recently purchased from the C. F. Burgess Laboratories, Inc., the buildings and land at 1011-1015 East Washington Avenue, Madison, Wis.

The officers are Howard F. Weiss, President; Kemper Slidell, Vice-President; Max H. Kliefoth, Treasurer; Milton J. Shoemaker, Secretary; and Miss Bertha Weisman, Assistant Secretary and Treasurer.

The viscous-coated throw-away type of air filter, formerly known as the Burgess Air Filter, is being manufactured and marketed by the Research Products Corporation under the name of Walton Air Filter.

The future plans of the Research Products Corporation, as reported in an interview with Mr. Kliefoth, Manager of the Air Filter Division, include an expansion of the air filter line to provide filter units for many new industries and applications. James Payton is Sales Engineer of the Air Filter Division.

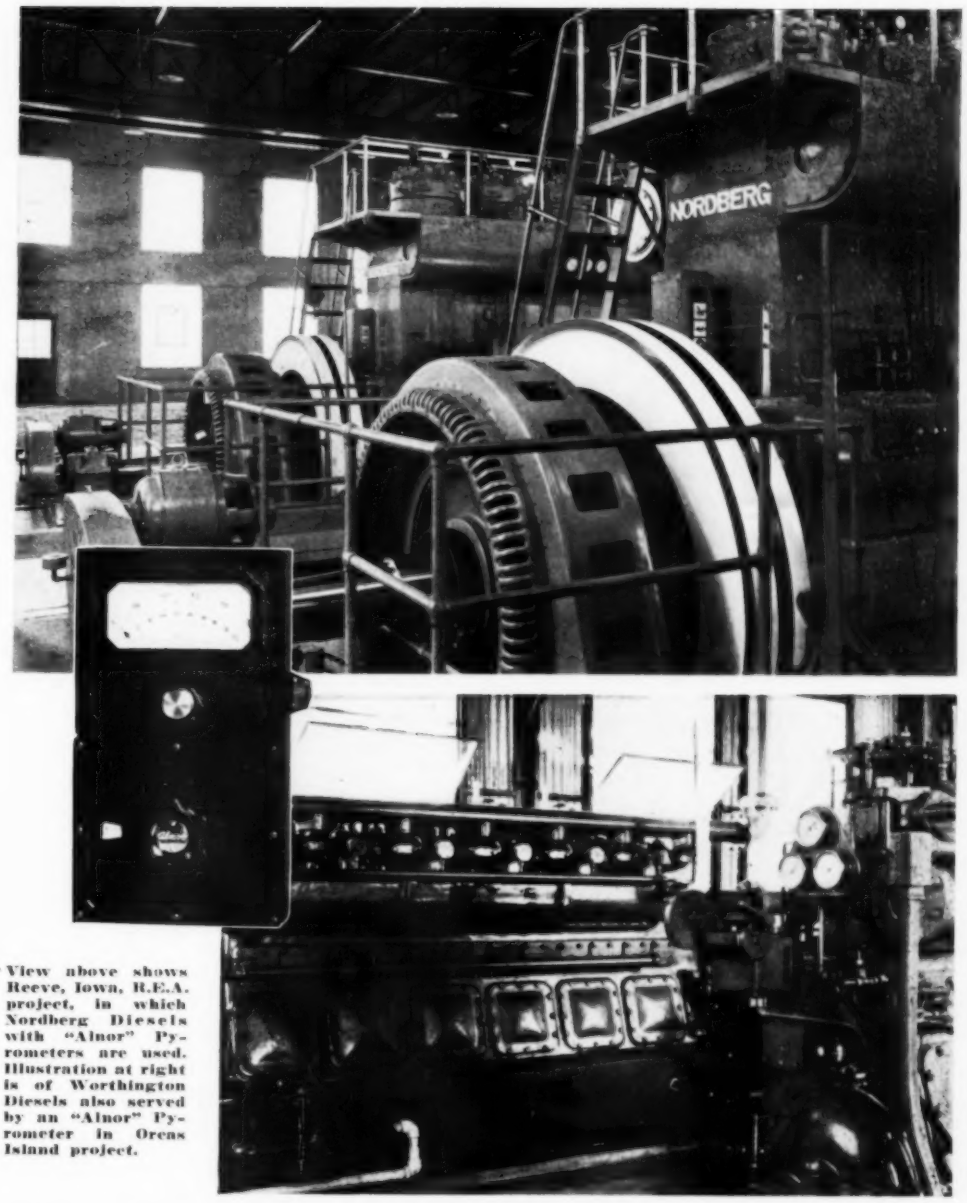
Kemper Slidell is Manager of the Water Conditioning Division which manufactures a high capacity zeolite for softening water, a mineral under the trade-mark "Birm," which removes iron from water, and a hydrogen exchange mineral sold under the trade name "Alkalex," which conditions water for steam boilers and other industrial uses.

A NEW PISTON RING

C. LEE COOK MANUFACTURING CO., Louisville, Kentucky, has recently issued a very interesting folder on their new non-scuff double-quick seating piston rings—a new development in the art of making piston rings. Copies of this bulletin are available to the readers of DIESEL PROGRESS by writing to the C. Lee Cook Manufacturing Co., either at Louisville, Kentucky, or 76 Beaver Street, New York City.

HARRIS IN NEW JOB

SID G. HARRIS has resigned from his connection with Macmillan Petroleum Corporation. He was sales engineer and later a district manager in connection with the marketing of Ring-Free motor oil. He is now Eastern representative for Faber Laboratories, Inc., Chicago, Ill., making his headquarters at their office, 11 West 42nd St., N. Y. C. Mr. Harris is a Member, Society of Automotive Engineers, having been Chairman, Metropolitan Section, during 1934-1935. He was formerly sales engineer for Continental Motors Corporation.



View above shows Reeve, Iowa, R.E.A. project, in which Nordberg Diesels with "Alnor" Pyrometers are used. Illustration at right is of Worthington Diesels also served by an "Alnor" Pyrometer in Orcas Island project.

R. E. A. and ALNOR

RURAL Electrification Administration engineers and consulting engineers on R.E.A. projects appreciate the value of having the Diesel engines protected by pyrometers.

It is significant that a majority of the Diesel engines serving R.E.A. projects are protected by "Alnor" pyrometers. In some instances the "Alnor" is used for Exhaust temperatures only. In an increasing number, the "Alnor" Combination Pyrometer is used to provide all temperature readings — exhaust, oil and water — with a single instrument.

The "Alnor" Combination Pyrometer is the only simplified high and low range instrument that gives extreme accuracy on both ranges. By providing all readings from a single location this "Alnor" Pyrometer aids to an even greater extent in helping the operating engineers obtain maximum engine performance.

Write for Catalog

ILLINOIS TESTING LABORATORIES, Inc.
424 NORTH LaSALLE STREET • CHICAGO, ILLINOIS

"Alnor" Pyrometers — *The* ENGINE *X-Ray*

Did you have

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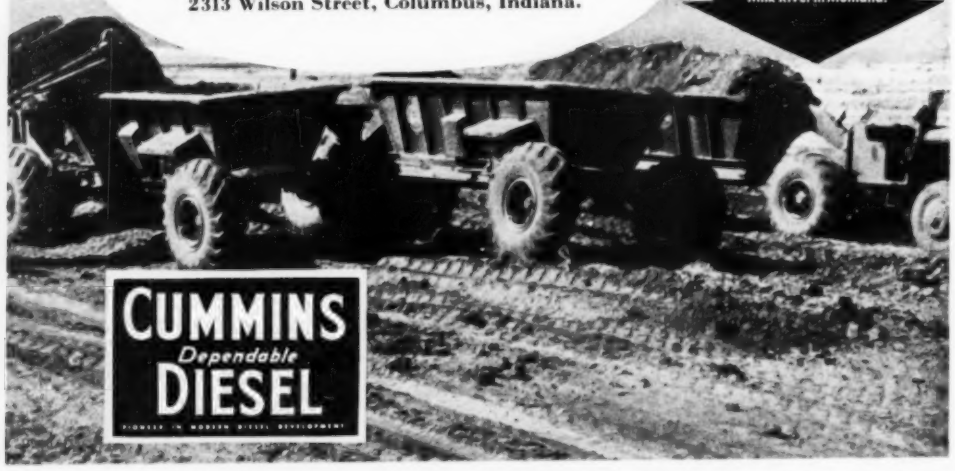
The contractor who owns Cummins Diesel powered dump trucks has the edge of job-test evidence . . . low dirt-moving costs.

He knows his Cummins Diesels will not let him down. He knows they will start instantly in any weather . . . no costly delays to men or machines. He knows they will not eat up their savings in expensive service and repair parts. Cummins Engine Company, 2313 Wilson Street, Columbus, Indiana.

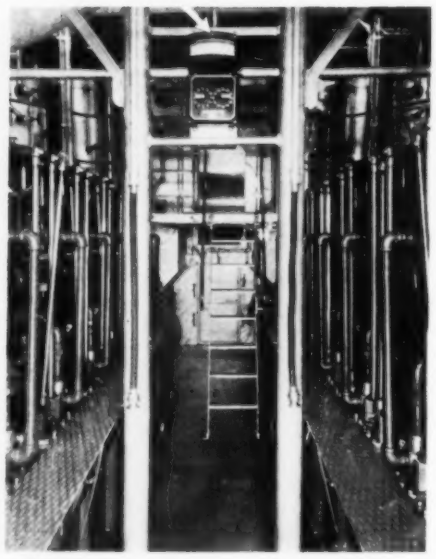
"JOB-TEST EVIDENCE"

Contractors Wachter, O'Neill and Megarry, Bismarck, N. D., use these Cummins Diesel powered Euclids on the Fresno Dam on Milk River in Montana.



"TATTLE-TALE" by WHEELCO

M.S. STRANGER
Length ....134 ft. Power ....Diesel
Two 400 H.P. Washington Diesel Engines



● A constant check of engine conditions on the M.S. *Stranger* is maintained by utilizing the Wheelco Model 1820 Diesel Engine Pyrometer. Accurate check on the total of 20 cylinders is possible with the single precision indicator combined with a 20 point and off multiple switch.

● Your exact specifications and requirements are also fulfilled by Wheelco's complete line of Diesel engine pyrometer equipment and supplies.

Data on Request

WHEELCO INSTRUMENTS COMPANY
1933 SOUTH HALSTED STREET, CHICAGO

BOSCH CHANGES NAME

AT a special meeting held on September 26th at the Company's New York Office, stockholders of the United American Bosch Corporation voted to change the name of the Corporation to American Bosch Corporation, and to change authorized capital stock to 750,000 shares of par value $1.00 per share.

A. C. SEYFARTH NEW IHC ADVERTISING MANAGER

RETIREMENT of Frank W. Heiskell as advertising manager of the International Harvester Company, after 45 years of service with that company and the McCormick Harvesting Machine Company, was announced yesterday by C. R. Morrison, vice president. Mr. Heiskell will be succeeded as advertising manager on October 1 by A. C. Seyfarth, at present assistant advertising manager.

Mr. Seyfarth, widely known in the advertising profession, entered the employ of the Harvester Company in 1904 after attending the University of Michigan and the University of Chicago, and after working for a short time as an advertising solicitor. His first job with the Company was as a catalog writer. Successive promotions advanced him to chief catalog writer and copy chief, where he was in charge of all advertising copy production. He became assistant advertising manager in 1913.

FODOR WITH DECO

NICHOLAS FODOR, well known in the Diesel engineering field, has been named Vice-President in Charge of Engineering of the Diesel Equipment Corporation, designers and manufacturers of Deco Fuel Injection Equipment. He will be located in Chicago, Illinois.

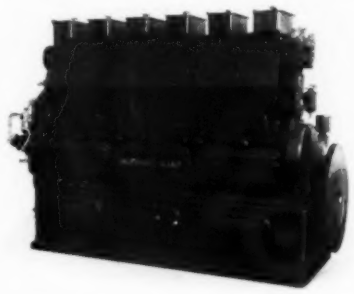
For the past four years, Mr. Fodor has been connected with the Allis-Chalmers Manufacturing Company in Milwaukee as Engineer in Charge of Oil Engine Development Work.

Mr. Fodor was graduated from the Royal Hungarian Technical University, Budapest, in 1922 with the degree of mechanical engineer. After graduation he was employed for two years at the L. Lang Machine Works in Budapest. In 1925, he joined the Fried Krupp organization as development and test engineer of Diesel engines and Diesel locomotives. He resigned from this connection in 1933 and became a consultant for high speed engine problems. In June, 1934, he entered the services of the Allis-Chalmers Manufacturing Company.

NEW DIESEL CATALOG

A NEW forty page bulletin on Type "S" Diesel Engine has just been published by Ingersoll-Rand. This machine is a heavy-duty, continuous-service, compact engine for stationary or marine-electric application.

It is a four-cycle, single-acting, solid-injection engine of the modern enclosed type having complete force-feed lubrication, wet liners, shell bearings, and many other refinements. Of particular interest is the low fuel consumption of 0.38 lbs. per BHP. Hr. at full load. The fuel injection system has an individual fuel pump for each cylinder and there are two single-acting non-clogging nozzles per cylinder.



The Type "S" Engine is built in sizes of 3, 4, 5, 6, 7 and 8 cylinders, and rated at 175, 230, 290, 350, 405 and 460 BHP. respectively for 600 revolutions per minute.

The bulletin is obtainable from the Ingersoll-Rand Company, 11 Broadway, New York City, or any of their branch offices.

HADLEY IN NEW JOB

S. A. HADLEY, 416 Dwight Bldg., Kansas City, Mo., will represent The Hilliard Corporation of Elmira, N. Y., in the sale of the Hilco Oil Reclaimer in this territory.

For Safety at Sea

"FIRE FIGHTER" and MAXIM

MOTOR VESSEL "FIRE FIGHTER"

General Motors Diesels power New York's new sea-going "Fire Fighter" . . . . . keep her ready for instant action. MAXIM SC2 spark arrestor silencers make clean decks and a quiet exhaust notable features of this vessel. Eliminate exhaust noise and the danger of flying sparks by installing MAXIM spark arrestor silencers on your engines.

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MODERN DESIGN — HIGH QUALITY

5 Types of Hand Hoists
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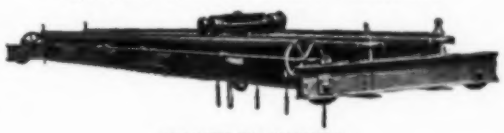
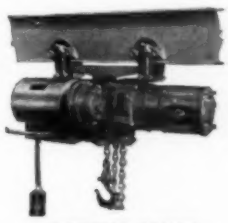
CHAIN HOISTS



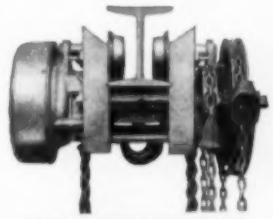
TRAVELING CRANES

PULLER



ELECTRIC HOISTS

I-BEAM TROLLEYS



LOW HEADROOM HOISTS

ORDERS!!

SEAPLANE TENDER CONTRACT LET

THE Navy Department has accepted the proposal of the General Motors Corporation, Cleveland Diesel Engine Division, to deliver two complete sets of main propelling machinery and Diesel driven generators, with either General Electric or Westinghouse electrical equipment; Farrel Birmingham gears and hydraulic couplings, for the Seaplane Tenders AVP. Noc. 10 and 11 for $1,655,410.00 — delivery to Bremerton Navy Yard, Bremerton, Wash.

MORE ATLAS ORDERS

U. S. ENGINEERS OFFICE, Charleston, South Carolina, purchased a four-cylinder 7″ x 8½″ Atlas Imperial marine Diesel engine, 80 hp., 650 rpm., for installation in the Survey Launch *Anna*.

Captain Dan Mullins, owner of one of the largest fishing fleets in New Bedford, has just purchased his third Atlas engine in two years — a three-cylinder 9″ x 12″ heavy-duty 75 hp. 325 rpm., for installation in the Dragger *Sankaty Head*.

BALDWIN SELLS SEVEN LOCOMOTIVES

THE Texas Mexican Railway Co. has purchased seven Diesel-electric locomotives from the Baldwin Locomotive Works and may become the first fully Dieselized railroad in the U.S.A.

The road is a small one, with only 162 miles of track and a present locomotive inventory of 16 steam units. It is planned to have the seven new Diesel locomotives take over the whole job formerly handled by the 16 steam locomotives. Corpus Christi, Texas, will be the mail terminal for these new Diesel trains.

SEAFORD, DEL., BUYS POWER PLANT

SEAFORD today owns its own electric light and power plant. Announcement was made by Mayor G. W. Donoho and the City Council that the town had exercised its franchise privilege to buy the entire property of the Seaford Light and Power Company, a subsidiary of Fairbanks, Morse & Co. of Chicago. The purchase price was given as about $200,000.

BIDS OUT FOR FORTY-FOUR SWITCHERS

WITH the New York Central negotiating for twenty-nine 600 hp. Diesel switchers and the Reading Railroad asking for bids on fifteen similar units, the market for Diesel electric switchers has been in a turmoil the past week or so. The proven economy of the Diesel electric switching locomotive is driving the railroads into buying these units in an ever increasing quantity, especially as it is now possible to buy them on what is practically a pay-as-you-earn basis.

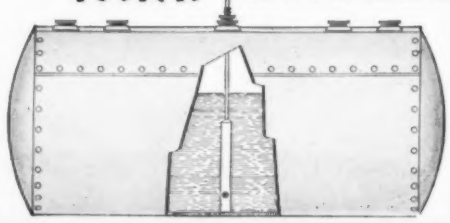
FLASH!!!

AS we go to press word comes that the New York Central has formally placed a contract with the Electro-Motive Corporation, La Grange, Illinois, for twenty 600 hp. switching locomotives to be equipped with General Motors Diesel engines.

At the same time, the Railroad placed a contract with the American Locomotive Company for nine similar units to be powered with 600 hp. Alco 4-cycle locomotive Diesel engines.

PETROMETER DISTANT READING TANK GAUGES

For the BEST DIESEL INSTALLATIONS



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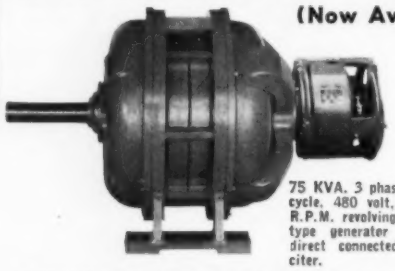
COLUMBIA A. C. GENERATORS
(Now Available with Automatic Voltage Adjusters)



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One Week to 10 Days
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Consult or write our employment directors at any of our schools:

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DETROIT VANCOUVER, B. C., CANADA

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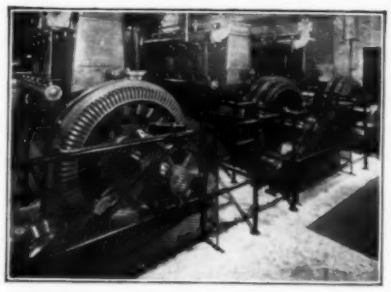
ONLY BUCKEYE DIESELS



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2. Full pressure lubrication system.
3. Sleeve cylinders.
4. Exhaust and intake manifolds not bolted to cylinder head.
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Engine Builders Since 1908

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Satisfaction Guaranteed

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AN ENGINEERING SERVICE

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Deutz DIESEL ELECTRIC POWER STATIONS
DIESEL TRUCKS
DIESEL MARINE ENGINES
4 TO 3000 HP.

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General Importers of Deutz Diesel Engines for U.S.A.
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TAYLOR MANUFACTURING CORP.
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For Engines and Compressors
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STOVER DIESEL
Saves Enough in Short Time to
PAY FOR ITSELF

The Johnson Garage at Little Cedar, Iowa, runs its 10 H.P. STOVER DIESEL 24 hours a day, 365 days per year, producing light and power — and saves $52.20 each month. It will pay YOU to find out how much a STOVER DIESEL will save while generating electricity, pumping, operating refrigerating machines, compressors and other machinery for you. Just write Dept. DE-64 for Special Diesel Bulletin giving facts and figures that show how STOVER DIESELS—

STOVER DIESEL ENGINES

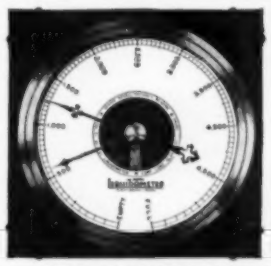
1. Reduce power costs 75% by using less and lower priced fuel oil.
2. Are quickly brought to full load from a cold start in any weather.
3. Produce smooth, quiet, continuous flow of power without smoke or vibration.
4. Simple, positive, complete fuel combustion, without expert attention.
5. Compact and sturdy with all parts, except flywheel, enclosed and running in oil.
6. Semi-portable, with all parts easily accessible for adjustment or replacement.
7. Balanced for marine service. Dependable under worst conditions. Eliminate fire hazard.

5, 7½, 10 and 15 H.P. HONESTLY RATED

WATCH THEM GROW IN SIZE AND POPULARITY

DISTRIBUTORS A few profitable territory franchises still open.

STOVER MFG. & ENGINE COMPANY
FREEPORT, ILLINOIS, U. S. A.



Check your fuel Supply at a Glance!

Write for Bulletin

THE LIQUIDOMETER CORP.
36-24 Skillman Avenue
Long Island City New York

NORMA-HOFFMANN
PRECISION BEARINGS
BALL • ROLLER • THRUST
for every load, speed and duty
NORMA-HOFFMANN BEARINGS CORP.
Stamford, Conn.

S·VIKING·
SAFETY CONTROLS *for* **DIESEL ENGINES**
VIKING INSTRUMENTS, INC.
37-46 9th Street, LONG ISLAND CITY, N. Y.

SAVE Fuel and Repair with MACMILLAN RING-FREE MOTOR OIL

M. S. STRANGER

two more

LISTER DIESEL

marine auxiliaries are aboard the

M. S. Stranger

Peet & Powers

INCORPORATED

70 EAST 45th ST., NEW YORK

FOR SALE . . . Two cylinders with new dry liners for Winton Diesel Engine. Size of engine 11" Bore 14" Stroke.

S. C. LOVELAND CO., Inc.
151 S. Front Street Philadelphia, Pa.

DELEHANTY

Trains the kind of

DIESEL MEN

You Want!

Complete, individual instruction including practical work in our own shops on all types of Diesel Engines and injection systems, qualifies Delehanty Diesel graduates for all positions connected with the operation, repair, maintenance and sales of Diesel equipment. When you need trained men consult us! No charge to either employers or graduates.

The DELEHANTY INSTITUTE

9 E. 16 ST., N.Y.C. • STuy 9-6900

ORDERS!!

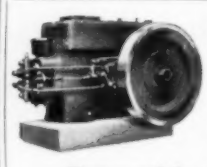
F-M BOSTON OFFICE BUSY

THE Boston office of Fairbanks-Morse has been "going to town" during the past few weeks. A 150 hp. model 35-E 8¾, five cylinder, two cycle, 450 rpm. engine for Capt. Weiderm's new Gillnetter *Mary A.* A 200 hp. model 35-E 10, five cylinder, two cycle, 400 rpm. engine to Capt. Pietro Mercurio for his Dragger and Seiner *Santa Maria.* A 40 hp. Model 36-A 4¼, four cylinder, four cycle, 1,200 rpm. engine with belt drive to compressor to McLane & Taylor Cold Storage Co., Manchester, N. H.

A 575 hp. Model 37-E 14, five cylinder, two cycle, 300 rpm. engine with oil cooled pistons to Cape Cod Trawling Co. for installation in their Trawler *Lark.* This vessel will also have a 120 hp. Model 36-A 5½, eight-cylinder, four cycle, 900 rpm. F-M winch engine. The *Lark* will also have a 40 hp. and a 20 hp. four cycle auxiliary engine, direct connected to F-M generators.

YOUNGSTOWN MILLER LANDS BIG ONE

YOUNGSTOWN MILLER CO., Sandusky, Ohio, recently sold the biggest oil purifier they have ever built to the General Machinery Corporation, Hamilton, Ohio, builders of Hamilton-M.A.N. Diesel engines. This Y-M purifier will be used in the engine testing department to remove fuel dilution, acids, water, sludge material anl dirt from the lubricating oil used in testing Hamilton-M.A.N Diesels.



Sendling Diesel

5 — 15 H. P.
4-CYCLE

Acro combustion chamber (pat.)
Renewable cylinder liner
Bosch pump — Bosch nozzle

Delivered Complete — Ready for Service

FRANK BAUER and CO.

ENGLEWOOD, NEW JERSEY

A NEW *ZEPHYR* FOR BURLINGTON

THE Burlington Lines have just ordered their ninth streamlined Diesel train to be powered with 1,000 hp. General Motors Diesel to be built in the shops of the Electro-Motive Corp. The Edward G. Budd Mfg. Co. is building this new four-car train, which will be placed in service between Kansas City and St. Louis. The Budd people are also building two new sleeping cars for the Denver *Zephyrs,* making each of these trains a fourteen-car train. The eight trains making up the present *Zephyr* fleet have traveled over six million miles since they were placed in service.

HUSSMAN GETS BIG ORDER

CARL HUSSMAN, who specializes in solving vibration problems and in building spring mountings to eliminate vibration, recently obtained an order from the Coast Guard Department for ten large spring mountings to be installed on the five new Coast Guard Tenders now under construction.

These Hussman spring mountings will support the eight cylinder 600 hp. General Motors Diesels and electric generators — two to each vessel — to be installed in these ships.

In addition, Carl Hussman has been given an order by the Coast Guard Department for ten spring mountings on which the 5 hp. Reiner-Stover auxiliary engines will be mounted. These mountings will be similar in type to the one installed on Mr. Ralph Friedmann's beautiful yacht *Tamaris,* described in detail on pages 18, 19 and 20 of this issue.

A SILVER MINE BUYS

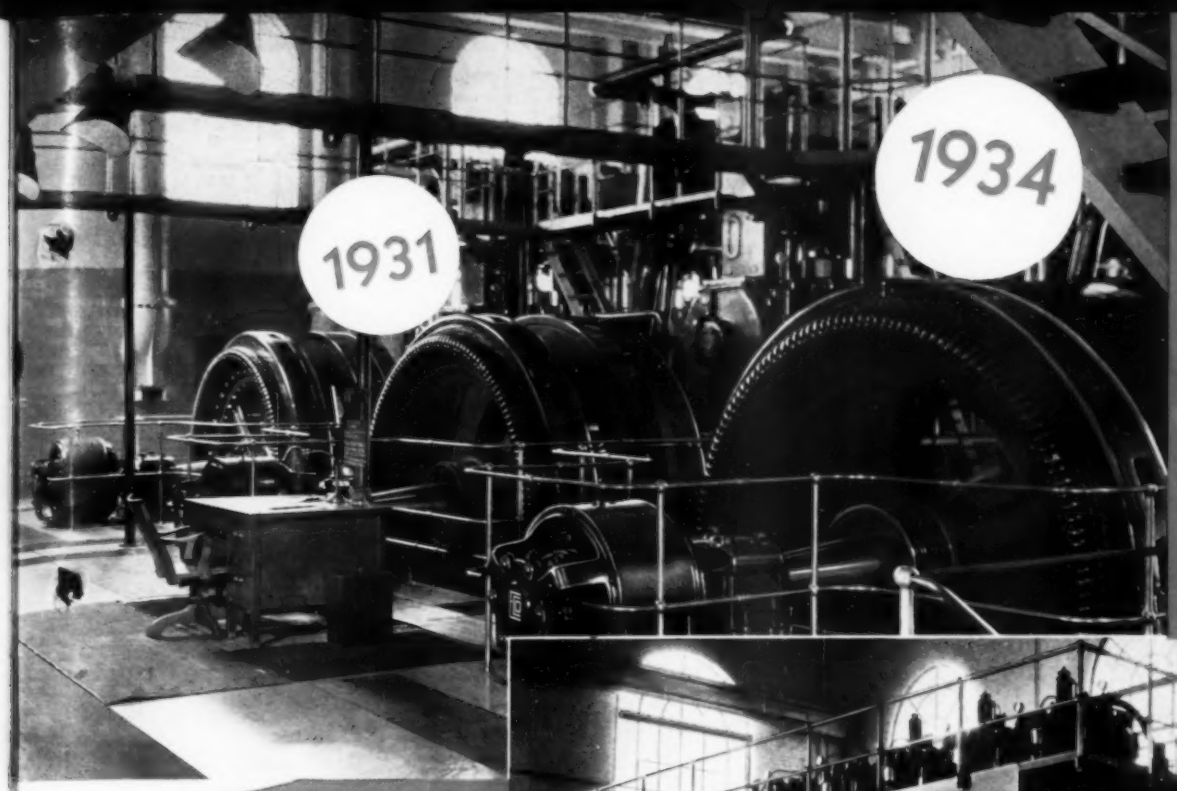
THE New York-Honduras Rosario Company, large operators of silver mines in Honduras, has purchased a pair of 300 kw. Cooper-Bessemer Diesel engines, direct-connected to Westinghouse generators.

FOR THE OIL GASOLINE & WATER CONNECTIONS

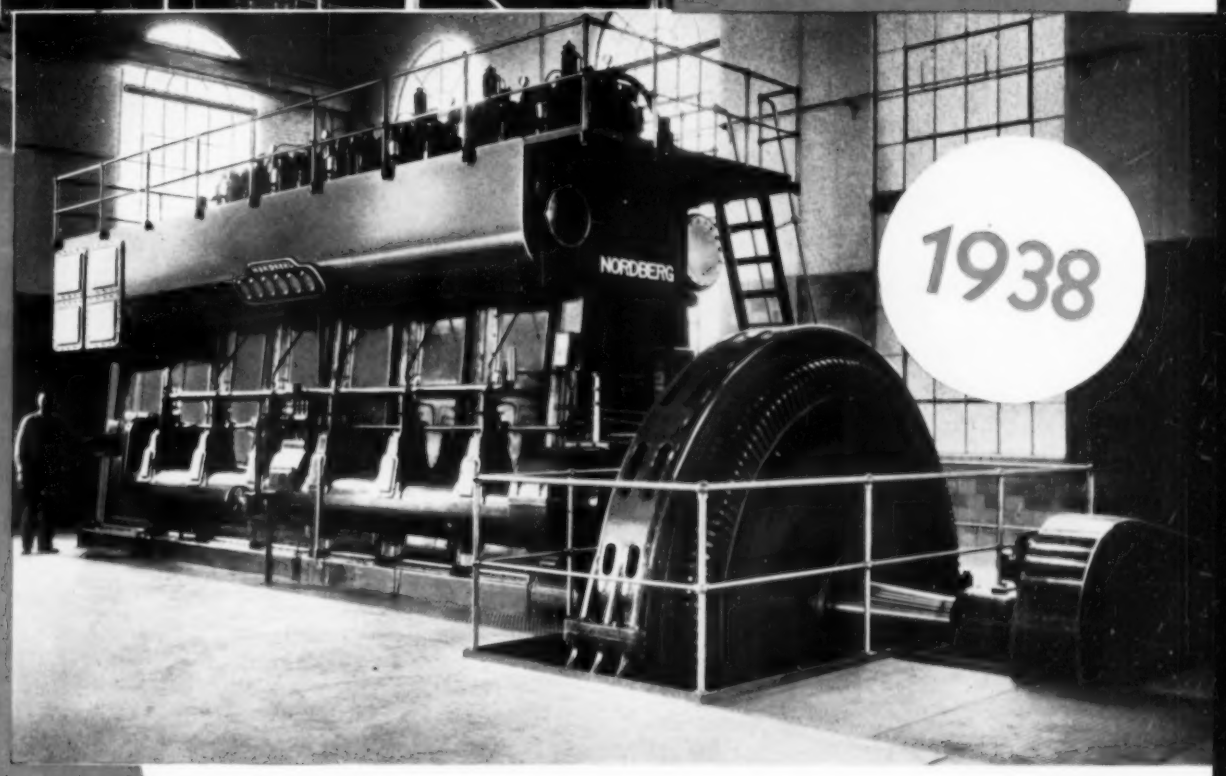
VELLUMOID

A compressible, tough, uniform sheet of Highest Quality, VELLUMOID makes tight connections which stay tight. Cut or tap out gaskets as you need them from Sheet Vellumoid. Avoid after-worries — ask for, and be sure you get genuine VELLUMOID.

THE VELLUMOID CO., WORCESTER, Mass., & DETROIT, Mich.



GRAND HAVEN, MICH. does it again!



selects its fourth ELLIOTT Generator for its fine municipal plant

AS nice a little tale of expansion as we know of, affects the City of Grand Haven, Michigan, which started up nine years ago with two De La Vergne Diesels driving 800-kw. Elliott generators. After the first five years, the plant was cleared of all indebtedness, and had added another 800-kw. unit—also with an Elliott generator.

The fine operating record continued—so did the growing power demand, which has recently been met with a fourth unit, 1600-kw. this time, and Nordberg, but with another Elliott generator, teamed up to deliver all the power its Diesel could provide.

No need to ask the city fathers of Grand Haven what their experience has been with Elliott generators. Plenty of other opinions, too, if you are interested—just ask us where Elliott generators are at work. And for the details of design and construction, descriptive bulletins on request.

ELLIOTT COMPANY
Electric Power Dept.
RIDGWAY, PA.

J-668

ELLIOTT GENERATORS *make fine teammates for* DIESELS

A New Cooper-Bessemer Engine ... *A New* "ELSBETH"!

Into the steel hull of Intercoastal Shipyard's seven year old tug "Elsbeth" went a new Cooper-Bessemer Diesel . . . 300 Diesel horsepower where there had been 110! That's what we call *compactness!* The entire change-over made by the owners with no outside assistance . . . That's what we call *adaptability!*

Now, the "Elsbeth" tows two 500-ton barges at six, instead of 3½, miles per hour! Three 600-ton barges are not unusual for her Mississippi River tows. Now, there are 300 economical Diesel horses ready for action when the going gets tough. And, she's been in continuous service thirteen months with never a delay for the engine!

Intercoastal Shipyards at Morgan City, Louisiana, say the new "Elsbeth" has everything! Why not investigate Cooper-Bessemer Diesel Engines for *your* marine power units?

Tug "Elsbeth", 64½ feet long, with 16 foot beam, re-powered with a Cooper-Bessemer Type GN, 6-cylinder Diesel, rated 300 hp at 400 rpm and turning a 60-inch propeller with 34-inch pitch.

THE COOPER-BESSEMER CORPORATION

Mount Vernon, Ohio — PLANTS — Grove City, Penna.

25 W. 43rd St. New York, N. Y. · Mills Building Washington, D. C. · Hoffar's Limited Vancouver, B. C. · 49 Duncan St. Gloucester, Mass. · 529 M & M Building Houston, Texas · 640 E. 61st St. Los Angeles, Calif. · Calmes Engineering Co. New Orleans, La.

The Pacific Marine Supply Company, Seattle, Wash.

IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR